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UNITED STATES DEPARTMENT OF AGRICULTURE

DEPARTMENT BULLETIN No. 1334

Washington, D. C. ▼ November, 1925

TESTS OF BARLEY VARIETIES IN AMERICA

By

HARRY V. HARLAN, Agronomist in Charge, MARY L. MARTINI, Assistant Botanist, and MERRITT N. POPE, Associate Agronomist, Barley Investigations, Office of Cereal Investigations Bureau of Plant Industry

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WASHINGTON
GOVERNMENT PRINTING OFFICE
1925

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SCOPE OF THE BULLETIN

Barley has been a minor crop in all but a few States of the United States. Many importations have been made, tried, and discarded by individuals and experiment stations. Often the same varieties have been reimported and retested at the same stations later. A few men have been particularly interested in barley. Until now no effort has been made to assemble the incidents and results of the early work. This task is becoming more difficult each year. Already the results of many tests have been lost. Cereal breeding is entering on a new basis, and if ever a summary is to be made of the pioneer work it is best made now.

The year 1921 has been chosen arbitrarily as the last one from which yields are included. This year divides fairly well a transition period. While the replication of plats is now the method in general use for the testing of varieties, the data for the year 1921 include about the last of the yields from unreplicated plats. Also, at about this time a large number of varieties produced by younger plant breeders made their appearance. The closer relationship existing between experiment stations resulted in these new varieties being grown promptly at a large number of places. To show the value of these new varieties, yields of several seasons after 1921 would need to be included.

This bulletin is the result of an attempt to gather together all the material available. The writers know that their work is far from complete. They feel sure that owing to the incompleteness of the records and the early date of many of the references the identification of some varieties can not be certain, but they feel that they are submitting something tangible which will be of use to the agronomists who have assisted them.

As far as possible all the yields obtained in field plats in the United States have been included. In some instances plat yields have been rejected because of failure to establish the identity of the variety or because of accident of season that vitiated the results. Doubtless there are included many results that the station agronomists would desire omitted. However, as one of the main purposes of this bulletin is the defining of ecological boundaries of various types of barleys, it is thought that these yields are valuable, at least from that standpoint.

While the writers of this bulletin may point with some justice to many tedious months of compilation and to an endless effort of identification, the real authors of this bulletin are the agronomists of the various States. It is only by their unselfish donation of data that this compilation has been made possible. That all States are not represented in the compilations is due not to any unwillingness on the part of their officials, but to the fact that they have not grown barley. The agronomists of every barley-growing State but one have made available all their station results on barley. They have not only granted the use of these data, but they have extracted the results and histories, which has been no small task. At a few of the stations some of the results were secured by them in cooperation with the United States Department of Agriculture, but even in the cooperating States the material furnished was far more than that jointly obtained. The writers desire hereby to express their appreciation of these many courtesies received from State agronomists.

BARLEY GROWING IN AMERICA

The demarcation of areas of adaptation is obviously an ecological study. The usual method of studying variation in plants is by classifying them as to their morphological characters. Fortunately, groups of varieties which vary in their climatic requirements also vary in their taxonomic features as well. In either case the grouping is merely a convenient method of study. When large numbers of varieties are considered the group limits merge, whether the separations be made on an ecological or a morphological basis. Even so, the discussion is materially facilitated by the use of these distinctions, and in most cases there is no confusion.

VARIETAL GROUPS

There are several ecological groups of barley which are well marked when typical varieties are considered. The most common of these in the United States are the Manchurian, which embraces most of the 6-rowed barleys of the temperate plains of Europe and Asia, and the Coast group, which includes many 6-rowed barleys from North Africa and Spain. Other well-known groups include the Chevalier and Thorpe of England, the Hanna of Bavaria and Austria, the Smyrna group of Asia Minor, and the hull-less forms of Central Asia. The differences between Chevalier, Gold, Thorpe, Manchuria, and Coast varieties are very apparent, and there is no overlapping. These barleys are adapted also to definite sets of ecological conditions. Other varieties adapted to these districts are often intermediate in character, especially where the districts merge into each other; that is, where sets of conditions overlap. The Chevalier variety is typical of England. Very similar barleys, however, are found in Denmark and Bohemia, where conditions similar to those of England exist. The Hanna barleys of Bavaria, Austria, and Bohemia differ somewhat from the 2-rowed sorts which are occasionally found in southern Russia.

The nodding Coast and more erect Peruvian types of North Africa are quite characteristic of that region. Stavropol, a variety brought from the dry Stavropol region of southern Russia, is similar to the nodding Coast type. In the areas north and east of the Black and Caspian Seas there are numerous 6-rowed barleys of local adaptation. These are grown on the border land between regions suited to the culture of barley of the North African type and those suited to that of the Manchurian type. Many of these varieties are intermediate between these groups. A variety partaking of the characters of two groups is defined to a certain extent by placing it in either one of them.

FOREIGN SOURCES

The original introductions of barley into America were entirely from Europe and North Africa. Later, barleys from Asia Minor were imported in a commercial way. The Nepal barley of India was introduced largely as a curiosity. In recent years numerous barleys have been brought into this country from Asia. Yields of many varieties from different parts of the world are reported in the tables of this bulletin. The commercial-barley acreage of the United States at the present time consists almost entirely of barleys from two ecological districts. These are (1) North Africa and (2) the central Eurasian Plain, which reaches through the level temperate countries from the North Sea, through Russia, and by a slender belt through Siberia to the Pacific Ocean.

The barleys of the western part of the United States are entirely of the North African group, with the exception of those grown in certain valleys, such as the Salinas of California, where unusual conditions occur. The North African barleys came into America with the Spanish invasion and spread with the settlements on the Pacific coast. These introductions were grown almost to the exclusion of all other varieties until the last few years, when two other North African barleys were introduced into general field agriculture. These were the Club Mariout and California Mariout from the district of Mariout, Egypt, the latter from nonirrigated lands. These varieties are now grown on an acreage which seems to assure their place in the western part of the United States, at least until others are brought in or developed. The 6-rowed barleys grown in the Mississippi Valley are of the type best adapted to the Eurasian Plain. The western European varieties of this group have been displaced in the last 50 years by introductions from Manchuria and Germany.

The two sources of barleys which are in most urgent need of exploration are North Africa, which has given us the dominant types of the Pacific coast, and Manchuria, which has furnished the most vigorous and most disease-resistant varieties of the Mississippi Valley.

In the Great Basin between the Rocky Mountains and the ranges along the Pacific coast there are many high plateaus and many mountain valleys, each differing from the neighboring ones. Barleys suited to the special valleys may best be found in southern and central Asia, where similar ecological conditions obtain.

HISTORY OF BARLEY GROWING

EARLY-GROWN BARLEYS

The first barleys grown in the various American settlements doubtless were those varieties from the homes of the settlers. The English probably brought with them the late 2-rowed barleys commonly grown in England, such as Chevalier and Thorpe. The Dutch brought the barleys of the mainland, and the Spanish the barleys of the Coast type. The Spanish settlements were largely in arid regions adapted to the culture of barleys of the Coast type. The barley of Spain was of North African origin, well suited to Mexico, western South America, and California. Although its history is not easily traced, it is likely that this cereal was an immediate success, that it was taken up widely in Mexico, and that it went into California with the missions. It is still the prevailing barley of the Western States.

Along the Atlantic seaboard conditions were not so favorable. All the settlements were in a region of humid summers, and most of them south of the latitudes where barley does well in humid growing seasons. The Chevalier and Thorpe types of England were suited to the eastern Provinces of Canada, but it was only when the settlements had penetrated western New York that an especially favorable area was found in the Eastern States. This area was better adapted to the culture of the Hanna and the 6-rowed varieties of the Continent than to the 2-rowed sorts of England. Barley production became important early in the history of New York.

After agricultural periodicals became common there are frequent notes on barley production, many of which indicate the nature of the varieties grown. The reports of the grain trade of Albany in the fifties show that 6-rowed barley was more common than 2-rowed in New York. A note by Chief Inspector Stevens, of Chicago, in the Prairie Farmer in 1860 stated that the 4-rowed barley was best suited for the Chicago market "because a majority of that grown in the Northwest is of that variety." In 1865 all correspondents of this paper seemed to be growing 6-rowed barley. The Wisconsin University Experiment Farm began distributing the Manchuria barley about 1873. This variety was widely disseminated, and its culture spread from farm to farm from the centers started by the distribution from the university farm. At the present time practically all barley that comes into the market in the northern Mississippi Valley is Manchuria or Oderbrucker.

The question naturally arises as to the identity of the 6-rowed barley widely grown before the introduction of Manchuria and Oderbrucker. There is little definite information on this point. In all probability it was very similar to Manchuria and Oderbrucker. It is inconceivable that it has now entirely disappeared. It probably is still grown by a small percentage of farmers. In all likelihood it differs little in appearance in the field or when threshed from the more recent introductions. This early 6-rowed barley probably consisted of the mixed stocks of the 6-rowed barley under cultivation in England, Scotland, and western continental Europe at the time of its importation into this country. These mixtures seem to differ from the more vigorous strain of Manchuria only in vigor and in the smaller proportion of biotypes with blue aleurone layers. Some of the strains also are characterized by slightly larger kernels.

Barley was being bred by selection at an early date in western Europe. The efforts at improvement were expended on the 2-rowed varieties. Until very recently the 6-rowed barleys remained as they were developed by ecological conditions. The Oderbrucker barley of Germany has proved to be the best west European 6-rowed sort tried in this country. As originally introduced it was not widely different from the Manchuria form, but has exhibited somewhat less vigor and a narrower range of adaptation.

TREND OF BARLEY GROWING

As has been remarked before, barley was introduced into America by the early colonists. The colonies first founded were along the Atlantic seaboard. In recent times barley has not done well on the Atlantic Coastal Plain. It is not well adapted to the types of soil most common there. It is probable that it grew to better advantage on the virgin soils when the land was first cleared. It was introduced into all of the colonies, where it was in demand as a grain for brewing. Both in the early colonies and in the later settlements of the Mississippi Valley barley invariably was planted, and considerable acreage developed near all of the larger cities. This acreage was in response to a city demand, and barley often was grown in districts to which it was not suited.

In the annual report of the United States Patent Office (agricultural portion) for 1853 (pp. 156, 157) there are several notes on the early history of barley. According to this report the introduction of barley in the North American colonies may be traced back to the periods of their settlement. It was grown by Gosnold, together with other English grains, on Marthas Vineyard and the Elizabeth Islands in 1602 and by the colonists of the London Company in Virginia in 1611. By the year 1648 it was grown in abundance in that colony, but its culture was allowed to decline soon after, in consequence of the more profitable and increased production of tobacco.

Barley appears to have been cultivated in New Netherlands as early as the year 1626, as samples of the harvest of that year, grown by the colonists on Manhattan Island, were sent to Holland with other grains as evidence of their prosperous condition.

According to the records of the governor and of the Massachusetts Bay Company in New England, barley was introduced into that colony in 1629. In 1633 good crops were grown in Lynn.

In 1796 the chief agricultural product of Rhode Island was barley, considerable quantities of which were raised.

Barley grew better in the colonies of New England than in those farther south, with the possible exception of the southeastern part of Pennsylvania, where the soils were especially suited to its production. The combination of favorable soil and climatic conditions was not found in any settlement in the United States until these settlements had reached central New York. Here both the soil conditions and the cool summers were favorable to the growing of barley.

A series of maps showing the production of barley in the census years from 1839 until 1919, inclusive, is given as Figures 1 to 8, inclusive. In 1839 some barley was still grown in the cooler sections of the Atlantic seaboard. Most of this was in Maine, although some was cultivated in New Hampshire and Massachusetts. The greater part of the American crop, however, was produced along the line of the Erie Canal, which traversed a section where the production of barley was profitable and gave ready access to the Albany, New York, and other city markets. The distribution of barley acreage along the canal is very apparent in Figure 1.

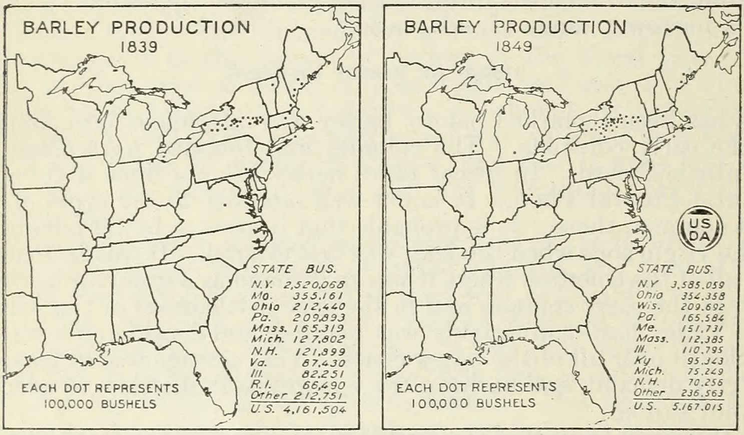

BARLEY PRODUCTION
1839
STATE BUS.
N.Y. 2,520,068
Mo. 355,161
Ohio 212,440
Pa. 209,893
Mass. 165,319
Mich. 127,802
N.H. 121,899
Va. 87,430
Ill. 82,251
R.I. 66,490
Other 212,751
U.S. 4,161,504
EACH DOT REPRESENTS
100,000 BUSHELS
BARLEY PRODUCTION
1849
US
DA
STATE BUS.
N.Y 3,585,059
Ohio 354,358
Wis. 209,692
Pa. 165,584
Me. 151,731
Mass. 112,385
Ill. 110,795
Ky 95,343
Mich. 75,249
N.H. 70,256
Other 236,563
U.S. 5,167,015
EACH DOT REPRESENTS
100,000 BUSHELS

FIG. 1.—In 1839 most of the barley of the United States was produced in New York. The production was heaviest along the line of the Erie Canal. There also was a fringe of production near the coast of New England and a small acreage on the favorable soils of southeastern Pennsylvania. The production of barley in 1849 was still centered in New York State. In the Mississippi Valley a city demand for barley for brewing was reflected in the beginnings of production near Cincinnati, St. Louis, and Milwaukee

There was but little change in the location of the acreage between 1839 and 1849. A little less was grown along the Atlantic seaboard. The New York acreage was more concentrated in the western two-thirds of the State. Barley cultivation had given way to the production of crops of higher money value on the soils of southeastern Pennsylvania. In response to the demands of growing cities, areas of production appeared near Pittsburgh, Cincinnati, St. Louis, and Milwaukee. This, of course, was a result of the demand for brewing barley.

By 1859 the New York acreage was centered in the western part of the State (fig. 2). The acreage around Cincinnati had expanded greatly, owing to the large demand for brewing in that city. This acreage disappeared in later years, when transportation was developed to the extent that barley could be brought from other sections more cheaply than it could be grown around Cincinnati.

The acreage about St. Louis, where the conditions are not favorable for the production of barley, never expanded as did that near Cincinnati. The cultivation of barley about Milwaukee, on the other hand, was extended very rapidly. In southern Wisconsin, northern Illinois, and along the Mississippi in eastern Iowa conditions were particularly favorable for securing higher yields. The demand of the Milwaukee and Chicago markets was such as to encourage production. The river transportation not only gave a market in St. Louis, but probably was responsible for the fact that a large acreage was never developed near that city.

Barley was introduced into California with the early missions. It was grown wherever there were settlements, because the districts were very well suited to barley production and there was no other grain which could be grown so successfully for feed. To this demand was added the brewing demand on the west coast. In 1848 gold was discovered in California. The population in the area about San Francisco increased very rapidly. With this increase there was a great expansion of the barley acreage. By 1859 California was producing as much barley as New York.

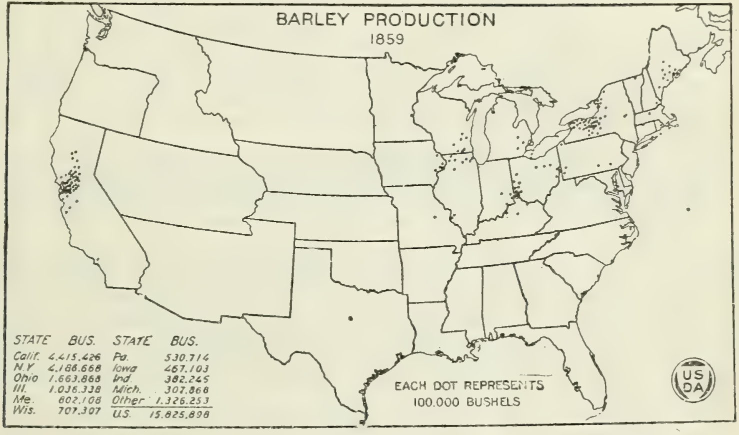
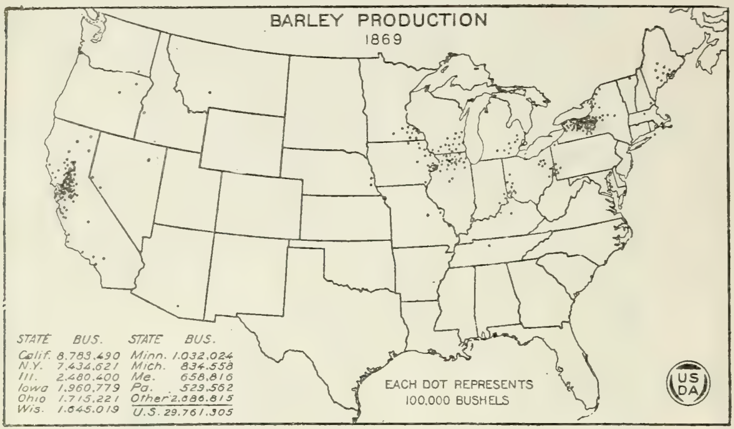

BARLEY PRODUCTION
1859
STATE BUS. STATE BUS.
Calif. 4.415.426 Pa. 530.714
N.Y 4.186.668 Iowa 467.103
Ohio 1.663.868 Ind. 382.245
Ill. 1.036.338 Mich. 307.868
Me. 802.108 Other 1.326.253
Wis. 707.307 U.S. 15.825.898
EACH DOT REPRESENTS
100.000 BUSHELS
US DA

FIG. 2.—By 1859 New York was losing its dominant position in barley production. Production had increased in southwestern Ohio, about Cincinnati, and still more notably in northern Illinois and southern Wisconsin. In this section barley had spread away from the local city market and become a general farm crop. Only a slight increase took place near St. Louis. The settlement of central California, following the discovery of gold, resulted in a production in the State fully as great as that in New York.

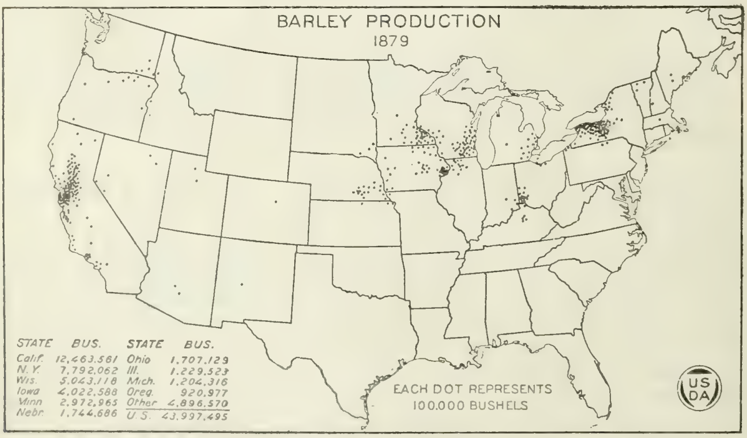
In 1869 the barley acreage was in the same regions as in 1859, but the area was more extensive (fig. 3). Both California and New York were growing more barley. The malting industry of western New York had developed greatly, and there was a resultant increase in production in that section of the State. The acreage in the eastern portion of Michigan, which is especially favorable to the production of barley, had increased. The greatest expansion occurred in the districts west and north of Chicago and Milwaukee. Conditions in the upper Mississippi Valley are well suited to the raising of barley. The extensive cultivation of this grain followed the settlements as closely as transportation developed to take care of the surplus crop. Southeastern Minnesota is a district in which both soil and climate are quite favorable and the acre yields are large. There was a considerable acreage in this part of the State in 1869, as may be seen in Figure 3.

By the year 1879 a large quantity of barley was raised in eastern Oregon and Washington (fig. 4). The conditions here are favorable to the growing of barleys of the type found in California. Barley was grown over a wider acreage in California than in 1869. Figure 4 shows that centers of production had become prominent in western New York, eastern Wisconsin, southeastern Minnesota, and central California. These centers were maintained for many years. Barley was grown as a cash crop, and the production was far beyond the local needs. It will be noted that there was a heavy increase in the production in southeastern Nebraska and a beginning of cultivation in the southeast corner of Dakota Territory. The acreage was not



STATE	BUS.	STATE	BUS.
Calif.	8.783.490	Minn.	1.032.024
N.Y.	7.434.621	Mich.	834.558
Ill.	2.480.400	Me.	658.816
Iowa	1.960.779	Pa.	529.562
Ohio	1.715.221	Other	2.686.815
Wis.	1.645.019	U.S.	29.761.305

FIG. 3.—In the decade from 1860 to 1869 barley became commonly cultivated in southeastern Minnesota and its culture was begun in eastern Oregon and Washington. There was a notable increase in southern Wisconsin and northern Illinois, and some increase in the southern section of the Great Plains area and in the Mountain States. California and New York, however, remained the most important producing States



STATE	BUS.	STATE	BUS.
Calif.	12,463.561	Ohio	1,707.129
N.Y.	7,792.062	Ill.	1.229.523
Wis.	5.043.118	Mich.	1,204.316
Iowa	4,022.588	Oreg.	920.977
Minn	2,972.965	Other	4,896.570
Nebr.	1,744.686	U.S.	43.997.495

FIG. 4.—In the years from 1870 to 1879 the total production of barley in the United States increased almost 50 per cent. The culture of barley was extended westward into eastern Nebraska and southeastern Dakota. It also became more widely distributed in the Pacific Coast States, while a small production was developing in Utah, Nevada, and Arizona

maintained in southeastern Nebraska in later years, while that of Dakota Territory expanded along the Red River and later over the eastern half of both Dakotas.

In the 10 years from 1879 to 1889 the development of centers of production in barley was accentuated. As a cash crop in 1889 it was grown on large acreages in five different centers, as may be seen from Figure 5. These were western New York, eastern Wisconsin, southeastern Minnesota, western Iowa, and central California. A considerable acreage was grown in Michigan, the area extending into northwestern Ohio. Barley was not so widely grown in northern Illinois as it had been previously. There was a marked expansion of the acreage in the Red River Valley.

In 1890 a law was enacted which raised the tariff to 30 cents per bushel. Western New York up to this time had been a great malting center. The malt houses of this district had obtained large quantities of barley from Canada. These houses had given a ready market to all the barley that could be produced in western New York. The tariff of 1890 was sufficient to make importation from Canada unprofitable. As malt weighs less per bushel than barley the malt houses of Wisconsin and Minnesota could ship to the eastern seaboard more cheaply than it was possible for the eastern malt houses to purchase barley for malting. The malting industry was gradually transferred from western New York to Wisconsin and neighboring States. This, in turn, decreased the market for barley in western New York, and this with the competition of other crops gradually reduced the acreage.

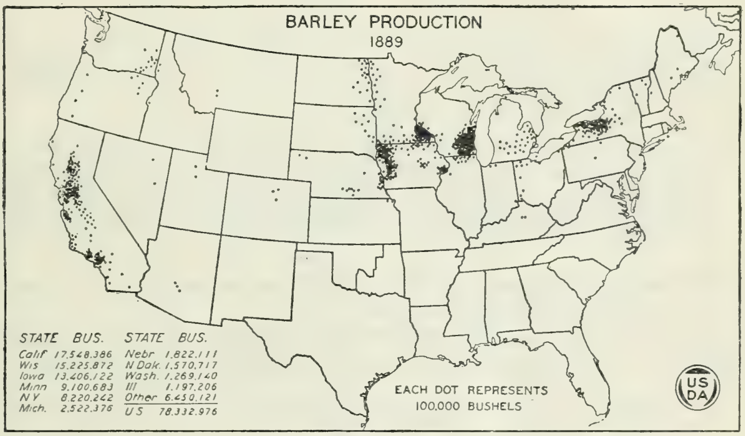


FIG. 5.—By 1889 there was a marked concentration of the areas growing barley for the malting market. On the favorable soils of western New York, southeastern Wisconsin, southeastern Minnesota, and northwestern Iowa, and in the central valley of California barley was grown as a money crop. At the same time production was increasing in the Red River Valley of Minnesota and North Dakota. The production of barley about Cincinnati decreased in the face of competition from the northern Mississippi Valley

In 1899, as shown in Figure 6, western New York was no longer one of the principal centers of production. However, the loss of acreage in New York State was much more than made up by the expansion in the Red River Valley and in eastern Oregon and Washington. By 1899 a large acreage of barley was grown in western

Kansas. Both in Nebraska and Kansas there were extensive changes, not only in the acreage but in the sections in which barley was grown. The portions of these States best adapted to the production of barley, when economic as well as climatic conditions are taken into consideration, were not yet growing barley.

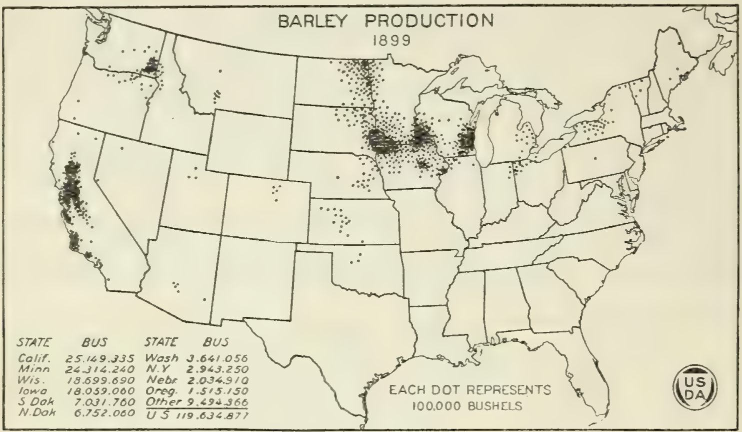

BARLEY PRODUCTION
1899
STATE BUS STATE BUS
Calif. 25.149.335 Wash 3.641.056
Minn 24.314.240 N.Y 2.943.250
Wis. 18.699.690 Nebr 2.034.910
Iowa 18.059.060 Oreg. 1.515.150
S Dak 7.031.760 Other 9.494.366
N.Dak 6.752.060 U S 119.634.877
EACH DOT REPRESENTS
100.000 BUSHELS
US
DA

FIG. 6.—In 1890 the tariff on barley was raised to 30 cents per bushel. The malt houses of western New York had been securing part of their barley from Canada, but this tariff made the importation of barley unprofitable. The near-by supplies were insufficient and the malting industry was transferred to Wisconsin and Minnesota. In New York the area devoted to barley decreased after 1890. Production increased notably in Minnesota and California, also in eastern Washington and Oregon, in the Red River Valley, and in the central section of the Great Plains area

In Figure 7, showing the production of barley in 1909, the center of cultivation in Kansas is more nearly in the section in which it will be permanent. The climatic and soil conditions of northwestern Kansas are better suited to the production of barley than is the case either east or south. It is probable that for economic reasons

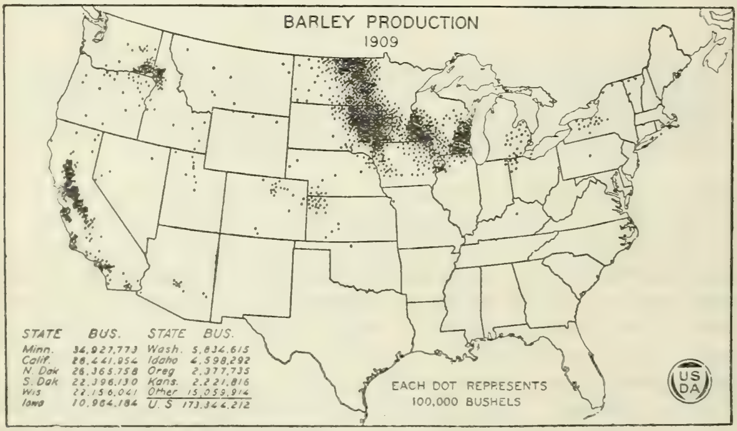

BARLEY PRODUCTION
1909
STATE BUS. STATE BUS.
Minn. 34,927,773 Wash. 5,834,615
Calif. 28,441,854 Idaho 4,598,292
N. Dak 26,365,758 Oreg 2,377,735
S. Dak 22,396,130 Kans. 2,221,816
Wis 22,156,041 Other 15,059,914
Iowa 10,984,184 U. S 173,344,212
EACH DOT REPRESENTS
100,000 BUSHELS
US
DA

FIG. 7.—The decade ending in 1909 was marked by the rapid expansion of the acreage in the Dakotas and the definite beginning of a center of production in northwestern Kansas. Minnesota was now the leading State, producing, with the Dakotas, almost half of the national crop. California, however, was a close second to Minnesota, with an average production of 29 million bushels in the last five years of this decade

the cultivation will be expanded both east and south, but northwestern Kansas, as is shown in this figure, will probably remain the center of production. By 1909 the acreage of barley on either side of the Red River had been enormously expanded. North Dakota, South Dakota, Minnesota, and Wisconsin were producing a large proportion of the total crop of the United States. The acreages around Cincinnati and St. Louis had long since disappeared.

After 1909 the acreage in southeastern Minnesota gradually decreased. This area was one of very high fertility, and only the profits of barley production prevented its development for diversified farming at an earlier date. As general farming increased in southeastern Minnesota, the acreage of barley grown as a cash crop decreased. This movement was already beginning, in advance of the decrease of the demand from malt houses which came with the increase of statutory prohibition. The crop of 1919 (fig. 8) was not a normal one as far as barley production was concerned. The war prices of wheat and the campaign to increase its acreage had resulted in a considerable expansion in the area sown to spring wheat in that year. The greatest increase in this crop came in the barley-producing sections of North Dakota, South Dakota, and Minnesota. The great difference which is apparent in the production of these two years, as shown in Figures 7 and 8, was not due entirely to the reduced acreage of barley. The acre yield of barley in the northern Mississippi Valley in 1919 was low, so that the production was reduced relatively much more than the acreage. The smaller production in southeastern Minnesota, on the other hand, was due in large part to the advent of diversified farming in that area, which had replaced the grain farming commonly practiced until about 1909.

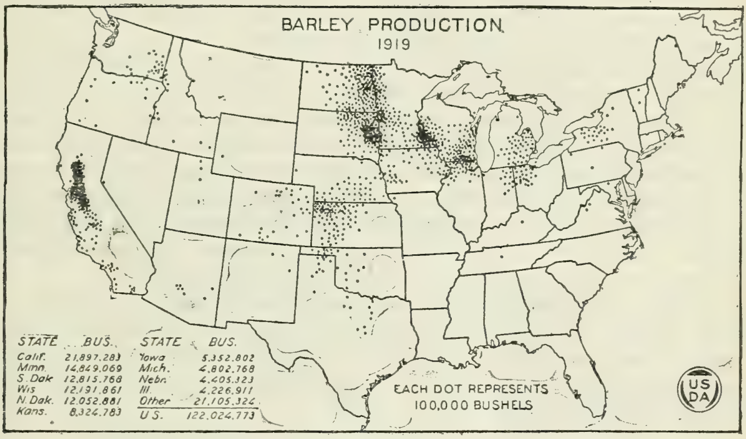


FIG. 8.—The production of barley in 1919 was abnormally distributed. The great increase in the spring-wheat acreage in the Dakotas, coupled with a low acre yield of barley, resulted in a lower production in these States in 1919 than in the years before or since. The decrease in southeastern Minnesota in 1919 was caused chiefly by the gradual drift away from barley as a money crop, a process which had been going on since 1910. The most remarkable development of production was in the central Great Plains area, especially Kansas. This probably is part of a permanent modification of the agricultural practice of the section

The most interesting change of acreage shown in the 1919 map is in Nebraska, Kansas, and Oklahoma. A center of heavy production is developing in northwestern Kansas. This area has extended southward into Oklahoma and Texas. The section is of especial interest, as there is an overlapping of conditions which allow types of barley adapted to quite different ecological regions to be grown in the same general area. In central Nebraska barleys of the Manchuria type grow very well. In northwestern Kansas those of the Coast and Stavropol types are most commonly grown. These varieties are cultivated farther south, and in Oklahoma their culture is found in the same district with winter barleys of the Tennessee Winter types. This is the only district in the United States where the extensive culture of both winter and spring varieties meets. In the Central States there is a margin of several hundred miles between the southern limit of profitable culture of spring barley and the northern limit of profitable culture of winter barley. It is true that in Ohio, Pennsylvania, and Maryland, and in the Palouse district of Washington, Oregon, and Idaho, both winter and spring barleys can be grown. Winter barleys in these States, however, are of only local importance, and the acreage is small.

The general distribution of barleys over the United States has followed the course of the settlements. It is a natural inquiry as to what influence agricultural experiment stations have had, especially on the varieties cultivated. Prior to 1870 the barleys under cultivation were doubtless those that had been introduced by the colonists, and agronomic experiments probably had little influence. Since then, however, the varieties grown on the farms have been greatly affected. As has been stated before, the experiment farm at Madison, Wis., began testing and distributing barley about 1873.

It is likely that most of the 6-rowed barley of the northern Mississippi Valley as now grown consists largely of varieties introduced by experiment stations. Recently in California these stations have introduced varieties which have been substituted on a large scale for others previously grown.

EXPERIMENTAL METHODS DEVELOPED

There is a feeling among many agronomists that the early experiments are without value, but a study of the data shows that this feeling is justifiable only in part and is not entirely warranted. The agronomic work of the older experiment stations has passed through three distinct phases of development. In the earliest phase the stations were undermanned and without suitable equipment for carrying on varietal tests. They worked with varieties obtained by chance and often with many of the desirable types absent from the tests. In the middle period both equipment and personnel were on a better basis, and larger collections of material were available for comparison. The tests were conducted, however, on the single-plat basis.

Recently the technic of field testing has been improved. Plats are more carefully laid out. Methods of testing have been developed, and a sufficient number of replications have been carried to form a basis for a statement of the probable mathematical significance of the yield. Unfortunately, one is not able to fix these periods by dates, as each station went through these phases independently. Some stations are not yet replicating plats.

With this better development of methods and with the better training of the younger generation of experimenters has come the doubt as to the value of the early tests. No student of agronomy fails to realize the progress that has been made in the methods of accurate valuation of cereal stocks. There is no reason to think that our present methods are fully accurate. On the other hand, there is no reason to believe that the early work was wholly inaccurate. Probably the early tests did not show the true rank of varieties of nearly equal value. They did afford an indication of these values, however, and most certainly did definitely and correctly establish the type of barley most valuable in many sections. The Wisconsin and Minnesota stations found the Manchuria-Oderbrucker barley to be the most promising type long before plats were replicated or varieties purified. In the typewritten report of the cooperative experiments at Davis, Calif., in 1909 the following statement occurs:

> Hardly sufficient data are at hand to make any definite statement as to the most promising varieties. About all that can be said is that, so far, we have no new variety that promises nearly so well as the common barley. It is certain that none will withstand as much wind as the common barley.

The Coast barley is still the common barley of the interior valley of California. Recently two new varieties have been grown. The California Mariout has been widely distributed in California, and the Club Mariout has been grown in a limited area. Both of these are of North African origin, and it is unlikely that either will displace Coast as the dominant variety, although the California Mariout is probably more wind resistant than the Coast.

PREPARATION OF MATERIAL

IDENTIFICATION OF VARIETIES

The identification of the varieties appearing in the early experiments has been very difficult. The order in which the experimental results were received by the writers from the State stations also was unfortunate. If the work could have started with the results from the Central Experimental Farm at Ottawa, Canada, and the State experiment stations of Wisconsin, Minnesota, and North Dakota at hand, the final compilation of data from all stations would have been better. These four stations, with the Agricultural College at Guelph, Ontario, are the key stations in tracing the early varieties. Many of these varieties were produced and many others first were tested at one or the other of these five institutions. Varieties frequently were sent back and forth between stations, unfortunately acquiring a new number with each accession until their identity was much confused. The same varieties also were obtained by seedsmen and reacquired by the stations from them. There was continual opportunity for mechanical mixture and always a possibility of confusing varieties by accident in such a way that they might be carried under a name other than the one originally used.

The identifications were made largely by the records of the stations and checked in various ways. The accession records of the American stations were made available to the writers. These records usually showed the source from which the seed was obtained and stated whether the lot was 2 rowed or 6 rowed. The field records of yields and growth often contained similar observations. The annual reports from the Canadian experimental farms frequently contained notes in addition to the yield and growth data. These notes were of great assistance. The senior writer visited Ottawa and Charlottetown for the purpose of obtaining further information as to the nature of the varieties grown in Canada and at both places examined specimens of many of the varieties grown in the earlier years at these stations. Among these were many type specimens of Doctor Saunders's hybrids. The senior writer has been identified with barley studies in the United States since 1909. Certain varieties grown at that time have since disappeared, and the memory of things seen even 10 or 12 years ago has been serviceable.

The writers know that the identifications are far from perfect. The records at many places were inadequate. Some stations had conducted varietal experiments for 15 years without an accession record of any kind. The writers, however, have spent nearly two years in an effort to make the presentation the best possible within the limits of reasonable expenditure of time and effort. For many stations it is thought that complete accuracy has been attained. For others the writers have done their best, but some uncertainty remains.

Probably some errors have been introduced by averaging varieties thought to be identical. The number of individual-plat yields was so large that to make the work as useful and available as possible yields were averaged where supposedly identical varieties were included.

From the standpoint of adaptation of barley types, minor errors and impurity of variety are not of dominant importance. There has been no attempt to make varietal recommendations from the results of the early experiments. Most of the barleys grown at that time were commercial varieties of what might be termed ecological races. Examples of these are Coast and Manchuria. Each of these contained a large number of biotypes which could be isolated as pure lines, but in each case these pure lines were adapted to the region of origin of the parent variety. These parent mixtures when grown for many years at a given experiment station in the United States under conditions which differed from those of the original habitat must alter decidedly in the proportions of the constituent strains. They must differ also from the resulting complex of the same mass variety grown at another station. They are comparable, however. The strains of each are similar, if not identical. They are as comparable with each other as with themselves from year to year. The yields of these varying mixtures of unpurified stocks must give a valuable indication of the types of barley adapted to the area where tested.

At experiment stations there also is mechanical mixing of varieties. This was doubtless greater in the earlier years than at present. Equipment and assistance are now more adequate. This mixing of varieties probably has not affected the identification and value of the results as here used. If a variety became mixed to the extent of 10 per cent with another that yielded only 80 per cent as much as the first, the yield would be reduced only 2 per cent. This is much less than is held to be a significant difference in this digest of results.

METHODS OF COMPILATION

The aim in this bulletin is to present the yields of barley varieties grown in field experiments in the United States and Canada. The Canadian yields were included because they have as much value for many American farmers as those of our own stations. Yields are reported of all varieties which are regarded as significant or which can be identified, at least as to group. A few varieties have been included without definite information even as to their group characters, but only when there was some hope of later identification or some particular significance to their yield. The number of varietal yields discarded because of lack of information has been very small, and such varieties usually have been tested but few years with mediocre results.

In many cases the individual yields of synonymous varieties are not reported. Unpurified Manchuria barleys with various station names and numbers are averaged under C. I. No. 244 when these trace directly to the Agricultural College of Guelph, Ontario. Likewise, those which trace directly to the original introductions of the Wisconsin Agricultural Experiment Station are averaged under C. I. No. 241. Averages have been made of commercial sorts only. Whenever a selection of any variety has been made, for example Manchuria, this selection has been given a number and retains its identity in all computations.

With the hybrid variety Horsford the averaging was perhaps more arbitrary, as the confusion was greater. Horsford (C. I. No. 507) here represents the hybrid type obtained by crossing Nepal with barleys of the Manchuria group. The resulting varieties are homozygous for only a few characters at best. While barleys of more than one mating may be listed under this number, they are of the same general type, and the procedure probably is justified. Not all varieties arising from such crosses are included under C. I. No. 507. In some cases the records of ancestry were clear enough to determine the history of the origin. Even in these cases the purpose of this bulletin would have been served by including these varieties also under C. I. No. 507. The greater number of the yields are presented without combining varieties or numbers. At most of the stations few, if any, averages were made.

For points where the data were sufficiently extensive, three tabular compilations have been made, although only the first and third are presented. The first of these shows the yields of the varieties by years. The varieties are listed in the chronological order of their first appearance in the experiments. This compilation embodies statements of the number of years grown; the average yield, which means little; and the average yield of each variety in terms of a percentage of the average of all varieties for the years grown. Suppose, for example, that Svanhals barley was grown during the years 1909, 1911, 1912, and 1913. The yields of all varieties for those years are then added together and divided by the number of yields. The average of the yield of Svanhals for these years is then divided by the average of all varieties for those same years; that is, the yield of Svanhals is computed as a percentage of the weighted mean yield of all varieties. Any basis of computing is open to objection. A comparison of the yearly average yield of Svanhals with the yearly average of all varieties gives undue emphasis to unusual yields in years when few varieties were grown. On the other hand, the weighted mean does not properly care for the differences of season. The weighted mean, however, is a correct mathematical statement, and it probably is as good a basis of comparison as any which can be used.

At stations where the number of varieties tested has been large, they can be arranged in groups. At many places, for example, several varieties of the Hanna group and several of the Manchuria group have been grown. Where the results are not evident in the first compilation, a digest has been made by placing all varieties of the various types in groups and a comparison made of the resulting groups. This is not a very satisfactory method, in that the groups contain varying numbers of varieties, and these seldom can be compared for the same number of years. However, the adaptation of the groups is so different that the errors due to the difficulties of compilation usually are less than the variation in yield of the groups. The performance of barleys of the different types is much more easily determined in a group digest than in the tabulation of individual yields. The details of this digest are not presented in tabular form, as the relationship can be clearly and concisely stated in the text itself.

Most agronomists are interested in a few prominent well-known varieties. A second digest, therefore, has been made and the results reported in tabular form. In this second digest a well-known variety of each group has been taken and compared with well-known varieties from the other groups. In many cases the choice has been difficult. It is necessary for reasonable comparison that each pair of varieties shall have been in the experiment during several coincident years. This limits the choice of varieties. Those used have not always been the best of the group to which they belong. They are representative in most instances, and they have been chosen with a view both to their local importance and to their inclusion in experiments elsewhere. Usually varieties that have produced good yields over several years at any station have been sent to other stations. Occasionally a high-yielding variety has been grown at one or only a few stations, but this is the exception. For the most part the digest is intended to cover the period of experimentation as well as can be done. The treatment necessarily varies as the data from the stations vary.

Later in this bulletin varieties which have shown promise in recent years are described. In this discussion and the table accompanying it the varieties most worthy of distribution in the light of recent tests are given. This is the only place in the bulletin where it is felt that definite recommendations as to specific varieties should be made.

The earlier work forms an invaluable background for the later. The earlier results in a way are a check upon the behavior of types over a long period of time. If a selection of Hanna has yielded well for two or three years in an area where the Hanna group has been promising in only 6 of the last 20 years, these recent results are not so conclusive as if the Hanna group had been uniformly good.

USE OF CEREAL INVESTIGATIONS NUMBERS

In preparing the material for publication it was necessary to use a single number to designate the same variety at the various stations. It is probable that State officials would prefer that the identity of the State number be preserved in this compilation. In practice this is not feasible, and it is especially impracticable with commercial varieties. At a given station most commercial varieties were obtained from other stations. If a single State number were to be given to a variety it should be that of the first State to number it. Often more than one State secured the variety from a common source. In many instances the variety was obtained by the State more than once either from the same or different sources. A serious study was made as to the best method of presenting the material. No other method seemed feasible, so a C. I. (Cereal Investigations) number was given to all varieties. Later in the bulletin under the C. I. number additional data are given which could not be repeated throughout the publication.

The part played by the various State stations in introducing varieties is emphasized in two ways. The table of C. I. numbers is intended to include all varieties listed in the tables, with a definite record of the origin of all pedigreed varieties. In the discussion of varieties all those of promise are treated individually and credited to the originators so far as the writers know them. If a variety is promising only at the original station it will be so shown in presenting the yields for that place. If it has a wider adaptation this is specifically considered elsewhere.

DISCUSSION OF STATION YIELDS

In discussing the varietal yields obtained in experiments at numerous stations covering most of the United States and Canada (fig. 9) it seems desirable to arrange them in three geographic groups, as

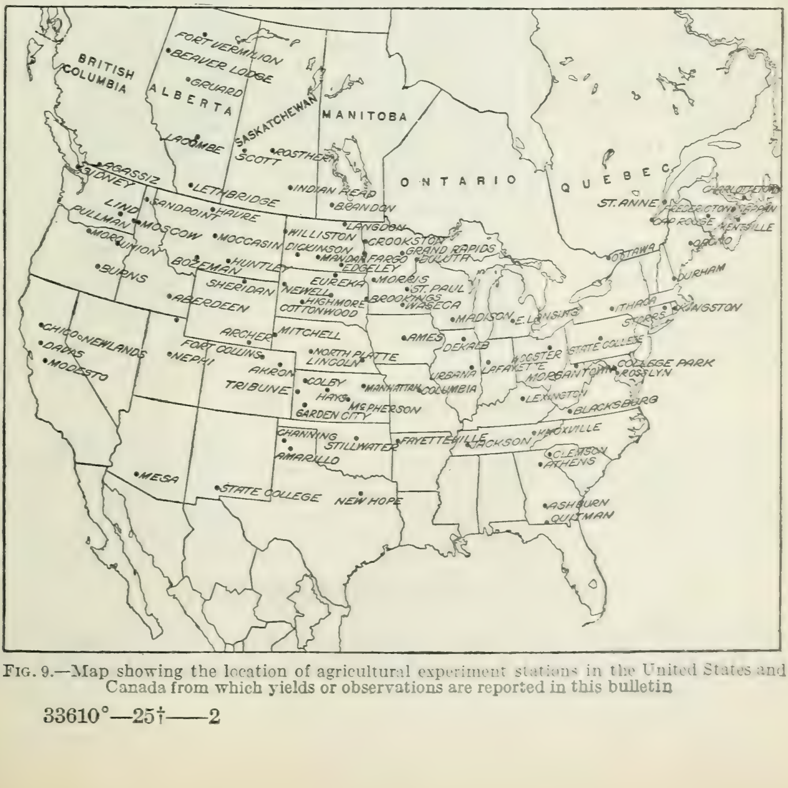

BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
FORT VERMILION
BEAVER LODGE
GRUARD
LACOMBE
SCOTT
ROSTHERN
AGASSIZ
SIDNEY
LETHBRIDGE
INDIAN HEAD
BRANDON
LIND
SANDPOINT
HAVRE
PULLMAN
MOSCOW
MORO
UNION
MOCCASIN
WILLISTON
DICKINSON
MANDAN
LANGDON
CROOKSTON
FARGO
GRAND RAPIDS
DULUTH
EDGELEY
BOZEMAN
HUNTLEY
BURNS
SHERIDAN
EUREKA
NEWELL
HIGHMORE
COTTONWOOD
MORRIS
ST. PAUL
BROOKINGS
WASECA
ABERDEEN
MADISON
E. LANSING
ITHACA
STORRS
KINGSTON
OTTAWA
DURHAM
ST. ANNE
CHARLOTTETOWN
FREDERICTON
NAPPAN
CAP ROUGE
KENTVILLE
ORONO
CHICO
NEWLANDS
DAVIS
MODESTO
ARCHER
MITCHELL
FORT COLLINS
NEPHI
AMES
DEKALB
NORTH PLATTE
LINCOLN
WOOSTER
STATE COLLEGE
LAFAYETTE
MORGANTOWN
COLLEGE PARK
ROSSLYN
AKRON
TRIBUNE
COLBY
HAYS
MANHATTAN
COLUMBIA
URBANA
LEXINGTON
BLACKSBURG
McPHERSON
GARDEN CITY
CHANNING
STILLWATER
FAYETTEVILLE
JACKSON
KNOXVILLE
AMARILLO
CLEMSON
ATHENS
MESA
STATE COLLEGE
NEW HOPE
ASHBURN
QUITMAN

FIG. 9.—Map showing the location of agricultural experiment stations in the United States and Canada from which yields or observations are reported in this bulletin

follows: (1) Stations in Canada; (2) stations in the northern half of the United States, where spring varieties are grown from spring sowing in the north and fall sowing in the far West; and (3) stations in the southern half of the United States, where winter barleys are grown.

In each group the individual stations are taken in their order from east to west. This has the advantage of showing the areas of adaptation of different types or varietal groups of barley. For example, in the Canadian group of stations there becomes apparent (1) the area where the Chevalier barleys are adapted, (2) the area where the Manchuria and Hanna groups do better, and (3) the semiarid area, where still other varieties are best adapted. The name and location of each station included in each of these three groups follow.

Canadian stations

Charlottetown, Prince Edward Island.
Nappan, Nova Scotia.
Kentville, Nova Scotia.
Fredericton, New Brunswick.
Ste. Anne de la Pocatiere, Quebec.
Cap Rouge, Quebec.
Ottawa, Ontario.
Brandon, Manitoba.
Indian Head, Saskatchewan.
Rosthern, Saskatchewan.
Scott, Saskatchewan.
Lethbridge, Alberta.
Lacombe, Alberta.
Fort Vermilion, Alberta.
St. Bernard Mission, Gruard, Alberta.
Beaver Lodge, Alberta.
Agassiz, British Columbia.
Sidney, British Columbia.
Invermere, British Columbia.

Northern United States stations

Orono, Me.
Durham, N. H.
Kingston, R. I.
Storrs, Conn.
Ithaca, N. Y.
State College, Pa.
Wooster, Ohio.
East Lansing, Mich.
La Fayette, Ind.
Urbana, Ill.
De Kalb, Ill.
Madison, Wis.
St. Paul, Minn.
Waseca, Minn.
Duluth, Minn.
Grand Rapids, Minn.
Crookston, Minn.
Morris, Minn.
Ames, Iowa.
Columbia, Mo.
Fargo, N. Dak.
Edgeley, N. Dak.
Langdon, N. Dak.
Mandan, N. Dak.
Dickinson, N. Dak.
Williston, N. Dak.
Brookings, S. Dak.
Eureka, S. Dak.
Highmore, S. Dak.
Cottonwood, S. Dak.
Newell, S. Dak.
Lincoln, Nebr.
North Platte, Nebr.
Mitchell, Nebr.
Manhattan, Kans.
McPherson, Kans.
Hays, Kans.
Colby, Kans.
Garden City, Kans.
Tribune, Kans.
Havre, Mont.
Moccasin, Mont.
Huntley, Mont.
Bozeman, Mont.
Sheridan, Wyo.
Archer, Wyo.
Fort Collins, Colo.
Akron, Colo.
Sandpoint, Idaho.
Moscow, Idaho.
Aberdeen, Idaho.
Nephi, Utah.
Pullman, Wash.
Lind, Wash.
Moro, Oreg.
Union, Oreg.
Burns, Oreg.
Newlands, Nev.
Chico, Calif.
Modesto, Calif.
Davis, Calif.

Southern United States stations

College Park, Md.
Arlington Experiment Farm, Rosslyn, Va.
Blacksburg, Va.
Clemson, S. C.
Athens, Ga.
Ashburn, Ga.
Quitman, Ga.
Morgantown, W. Va.
Lexington, Ky.
Knoxville, Tenn.
Jackson, Tenn.
Fayetteville, Ark.
Stillwater, Okla.
New Hope, Tex.
Amarillo, Tex.
Channing, Tex.
State College, N. Mex.

CANADIAN STATIONS

As noted previously, these stations are taken in their order from east to west, beginning with Prince Edward Island and ending with those in British Columbia.

CHARLOTTETOWN, PRINCE EDWARD ISLAND

The climate of Prince Edward Island is analogous to that of England. The summers are mild, and the growing season of barley is long. As might be expected the dominant varieties are of the Chevalier type. This is due not only to their superior adaptation, but to the farming system on the island. Very few fields of pure barley are grown here. As in a large part of eastern Canada, barley and oats are grown together, and the resulting crop is used as feed without the separation of the two. The yield from these mixed fields is higher than from either barley or oats seeded alone. As the oat crop is later in maturing than barley, only the late-ripening varieties of barley are suited to mixing with oats at seeding time.

TABLE 1.—*Annual acre yields of varieties of barley grown at the experiment station for Prince Edward Island (at Charlottetown) in part or all of the six years from 1910 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1913	1914	1915			
Albert	1551	80.7	50.6	51.4	52.5	71.4	56.1	6	60.5	102.4
Claude	1557	79.5	51.9	------	------	------	------	2	65.7	121.4
Mensury	2657	79.2	37.4	------	------	------	------	2	58.3	107.8
Nugent	176	70.6	60.7	54.2	56.2	70.3	60.8	6	62.1	105.1
Mansfield	2241	66.0	35.7	------	------	------	------	2	50.9	94.1
Stella	2678	63.4	44.9	60.1	53.9	79.3	67.6	6	61.5	104.1
Odessa	182	61.6	45.7	65.3	51.8	65.3	63.7	6	58.9	99.7
O. A. C. 21	1470	60.1	53.5	66.7	53.1	70.9	64.5	6	61.5	104.1
Trooper	173	58.9	37.9	63.9	46.9	81.2	66.6	6	59.2	100.2
Yale	1592	55.2	39.7	------	------	------	------	2	47.5	87.8
Oderbrucker	2700	48.7	41.6	68.0	51.4	69.3	63.0	6	57.0	96.4
Invincible	590	83.3	45.3	53.0	58.7	65.4	61.0	6	61.1	103.4
Chevalier II	200	80.6	50.1	66.7	57.7	74.1	71.0	6	66.7	112.9
Hannchen	531	77.3	38.9	62.3	65.0	78.3	------	5	64.4	110.1
Standwell	584	59.6	45.7	57.4	49.8	64.5	54.9	6	55.3	93.6
Clifford	1910	59.4	41.7	49.0	48.7	65.2	------	5	52.8	90.3
French Chevalier	175	58.3	44.4	------	------	------	------	2	51.3	94.8
Beaver	1915	53.7	41.0	46.3	48.4	52.9	40.8	6	47.2	79.9
Canadian Thorpe	740	51.6	43.3	61.6	56.4	70.2	57.3	6	56.7	95.9
Jarvis	2672	50.7	42.1	------	------	------	------	2	46.4	85.8
Danish Chevalier	180	49.1	43.9	------	------	------	------	2	46.5	86.0
Manchurian	739	------	43.4	67.0	54.5	69.3	62.6	5	59.4	102.6
English Chevalier	2733	------	------	67.9	68.6	83.3	------	3	73.3	117.7
Gold	1145	------	------	------	63.2	82.3	73.5	3	73.0	115.9
Early Chevalier	2725	------	------	------	------	65.0	59.3	2	62.1	92.8
Charlottetown 80	2732	------	------	------	------	------	75.3	1	75.3	120.7

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF SIX REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages					
			Chevalier II	Invincible	Hannchen	Manchurian	Odessa	Stella
Chevalier II	200	Years comparable	--------	6	5	5	6	6
		Percentage yield	--------	109.1	102.3	107.7	113.2	108.4
Invincible	590	Years comparable	6	--------	5	5	6	6
		Percentage yield	91.6	--------	95.0	95.5	103.8	99.3
Hannchen	531	Years comparable	5	5	--------	4	5	5
		Percentage yield	97.8	105.3	--------	104.4	111.1	106.7
Manchurian	739	Years comparable	5	5	4	--------	5	5
		Percentage yield	92.9	104.7	95.8	--------	101.7	97.1
Odessa	182	Years comparable	6	6	5	5	--------	6
		Percentage yield	88.3	96.4	90.0	98.3	--------	95.7
Stella	2678	Years comparable	6	6	5	5	6	--------
		Percentage yield	92.3	100.7	93.7	103.0	104.5	--------

In Table 1 are given the yields of the varieties grown during all or part of the years 1910 to 1915, inclusive. Of those grown for the entire period of six years Chevalier II (C. I. No. 200) gave a yield of almost 113 per cent of the weighted mean. In the first group digest, the detailed statement of which does not appear here, the yields of the varieties falling in the Chevalier, Thorpe, Hanna, Manchuria, and hybrid groups were summarized. The Chevalier group gave the highest yield, Hanna the second highest, Manchuria third, and Thorpe fourth. Although nine hybrid varieties were tested the group yields of the hybrids were inferior to those of the other groups. In the summarized digest of Table 1 six important varieties are compared. It is obvious that the group yields are not always indicative of the relative value of types. The general average yield of a group with many varieties may be lower than that of a group which contains only a few, when in reality the best-yielding individual varieties are in the large group. This happens, of course, when all of those of the small group are much better than the average, while only a few of the varieties of the larger group are superior. The table shows that Chevalier II was the best variety during the six years compared. Hannchen (C. I. No. 531) was almost as good as Chevalier II, and Manchurian (C. I. No. 739) was fourth. Stella (C. I. No. 2678), one of the better hybrids produced by the Central Experimental Farm at Ottawa, was third among the six varieties compared.

NAPPAN, NOVA SCOTIA

At Nappan, Nova Scotia, 75 varieties of barley were tested during one or more of the 26 years from 1890 to 1915, inclusive. It will be noticed in the statement of percentages in Table 2 that varieties belonging to the Chevalier and Manchuria groups are almost uniformly good. Several varieties now well known were not introduced until late in the experiments, and it may be that the number of years they were tested was insufficient to give a proper estimate of their value. The yield obtained from Gold (C. I. No. 1145) was very good in the two years tested. Manchurian (C. I. No. 739), Hannchen (C. I. No. 531), and O. A. C. 21 (C. I. No. 1470) were not outstanding at Nappan. These have proved to be promising sorts at many other stations, and it is rather surprising that they do not yield better at Nappan. Others of the same groups did well at that place. In the group digest made from the yields of barley varieties at Nappan the Manchuria group was decidedly better than the others compared. The Chevalier was second, the Hybrid third, and the Hanna last in point of yield.

These group relationships show that although Nappan is on the mainland, only a few miles from Charlottetown, the section is not so favorable as Prince Edward Island for the growing of Chevalier barleys. This point is also brought out in the summarized digest in which 10 promising varieties of various groups are compared. Of these Mensury (C. I. No. 2657) is the best, French Chevalier (C. I. No. 175) is almost equal to it, and Stella (C. I. No. 2678), Odessa (C. I. No. 182), and Canadian Thorpe (C. I. No. 740) follow in the order named. The poorest of the 10 was Blue Long Head (C. I. No. 2685). This is of interest, as this variety belongs to the Coast group and is best adapted to arid and semiarid climates where the ripening season occurs during an almost rainless period. Success (C. I. No. 2707) was inferior to all others except Blue Long Head (C. I. No. 2685), Petschora (C. I. No. 2658), and Nepal (C. I. No. 595). Petschora is an early form received from a section of Russia much farther north than Nappan.

TABLE 2.—*Annual acre yields of varieties of barley grown at the experimental farm for Nova Scotia (at Nappan) in part or all of the 26 years from 1890 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C.I. No.	Acre yields (bushels) 1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	Years grown	Average yield (bus.)	Percentage of weighted mean
Petschora	2658	35.0	----	----	----	31.7	37.9	17.9	45.4	29.2	45.0	52.5	46.7	42.5	----	----	----	----	----	----	----	----	----	----	----	----	----	10	38.4	96.0
Baku	333	14.5	41.1	35.0	15.8	19.6	28.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	25.8	71.9
English Malting	2654	21.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	21.5	76.0
Early Minting	2661	19.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	19.0	67.1
Peerless White	2617	32.0	47.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	39.7	96.6
Selected Chevalier	2662	44.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	44.0	155.5
Goldthorpe	327	29.7	63.6	45.0	26.7	25.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	38.2	108.5
Baxter	185	20.0	46.8	45.0	37.1	24.2	34.2	36.3	37.4	41.7	55.8	47.5	59.2	53.3	59.2	39.2	----	----	----	----	----	----	----	----	----	----	----	15	42.5	103.7
Rennie Improved	181	40.0	57.5	50.0	19.0	26.3	32.9	17.9	40.8	34.2	44.2	52.5	46.7	51.7	45.8	45.0	34.6	----	----	----	----	----	----	----	----	----	----	16	39.9	97.8
Odessa	182	40.5	60.8	60.0	20.0	31.3	52.1	22.9	46.3	40.8	45.8	51.7	60.0	51.7	60.8	43.3	31.3	45.0	35.8	43.3	48.3	52.1	39.2	48.3	41.7	36.9	40.3	26	44.2	106.8
Bhagarmany Hills	2698	15.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	15.5	54.8
Prize Prolific	169	25.0	50.0	50.0	27.1	24.6	38.3	33.3	34.2	27.5	42.5	46.7	42.5	38.3	----	----	----	----	----	----	----	----	----	----	----	----	----	13	36.9	92.0
Sharpe Chevalier	2650	31.0	44.6	----	26.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	33.9	96.6
Saale	2645	----	51.7	40.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	45.9	94.6
Golden Melon	411	----	52.1	55.0	32.2	34.2	32.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	41.1	112.0
Danish Chevalier	180	----	44.2	45.0	----	26.7	42.5	26.7	39.6	33.3	49.2	63.3	38.3	60.8	65.0	57.5	42.9	51.7	56.7	50.4	49.2	45.8	----	----	----	----	----	19	46.8	112.2
Thanet	2652	----	45.4	55.0	22.1	20.4	35.4	32.3	29.2	24.2	41.7	55.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	10	36.1	93.3
Kinver Chevalier	587	----	48.3	25.0	----	36.7	37.1	26.3	32.5	25.8	44.2	40.0	33.3	44.2	----	----	----	----	----	----	----	----	----	----	----	----	----	11	35.8	87.1
Duckbill	1916	----	71.1	45.0	31.7	27.9	30.4	28.7	41.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	7	39.5	108.5
Oderbrucker	2700	----	71.5	55.0	25.0	30.4	38.3	37.1	50.4	45.8	43.3	42.5	61.7	52.5	66.7	45.8	34.2	42.9	37.4	40.8	46.3	56.7	49.2	57.5	39.2	33.1	43.7	25	45.9	110.3
Mensury	2657	----	65.6	50.0	19.6	34.8	44.6	61.7	52.1	37.5	55.8	60.0	56.7	50.0	60.0	49.2	48.3	43.3	41.7	42.9	51.7	50.0	----	----	----	----	----	20	48.8	118.4
Golden Grain	588	----	24.6	60.0	18.6	30.4	44.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	35.6	97.0
Himalaya	1934	----	19.8	45.0	24.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	29.7	73.5
Canadian Thorpe	740	----	----	----	20.4	29.2	46.7	17.5	40.8	27.5	50.8	58.3	44.2	50.8	59.2	22.5	34.2	25.8	44.2	35.4	47.5	40.0	35.8	42.5	40.0	53.1	41.0	23	39.5	95.6
French Chevalier	175	----	----	32.3	18.3	36.7	47.9	31.3	35.8	30.0	64.2	55.0	52.5	49.2	58.3	45.8	44.6	46.7	58.3	57.8	55.0	39.2	59.2	62.5	35.8	58.6	48.7	24	46.8	113.0
Common	184	----	----	----	40.0	16.7	42.1	25.8	42.5	37.5	34.2	53.3	64.2	63.3	63.3	43.3	47.5	42.5	----	----	----	----	----	----	----	----	----	14	44.0	108.9
Newton	172	----	----	----	20.0	20.4	35.4	22.1	40.8	33.3	57.5	47.5	45.0	50.0	64.2	26.7	38.7	----	----	----	----	----	----	----	----	----	----	13	38.6	95.1
Royal	1252	----	----	----	----	37.5	45.4	29.2	48.3	33.3	36.7	56.7	41.7	59.2	58.3	49.2	39.2	38.3	----	----	----	----	----	----	----	----	----	13	44.1	107.8
Phoenix	2676	----	----	----	----	32.1	41.0	26.3	40.4	34.2	35.8	52.5	42.9	39.2	----	----	----	----	----	----	----	----	----	----	----	----	----	9	38.3	94.8
Summit	174	----	----	----	----	28.7	34.2	42.1	38.7	36.7	41.7	40.0	40.8	43.3	54.2	44.2	38.7	36.7	28.3	----	----	----	----	----	----	----	----	14	39.2	96.1
Trooper	173	----	----	----	----	26.3	43.3	47.9	40.0	40.8	38.3	57.5	41.7	54.2	65.0	50.0	34.6	33.3	33.3	41.7	47.5	48.3	40.0	----	----	----	----	18	43.5	104.8
Surprise	171	----	----	----	----	25.4	41.7	56.7	40.0	29.2	42.5	54.2	40.0	53.3	----	----	----	----	----	----	----	----	----	----	----	----	----	9	42.6	105.4
Beaver	1915	----	----	----	----	27.5	27.5	33.3	34.6	40.8	55.8	65.0	56.7	43.3	60.8	42.5	43.3	39.2	46.7	49.2	45.8	38.3	55.8	44.2	33.3	30.0	38.4	22	43.3	103.8
Sidney	178	----	----	----	----	40.6	27.8	26.7	38.3	32.5	43.3	42.5	38.3	45.8	43.3	32.5	35.0	29.2	29.2	40.0	----	----	----	----	----	----	----	15	36.3	88.8
Stella	2678	----	----	----	----	37.5	34.6	42.1	38.7	46.7	45.0	47.5	38.3	58.3	58.3	45.8	45.0	34.2	38.3	45.4	55.0	60.0	46.7	46.7	35.8	45.9	38.4	22	44.7	107.2
Bolton	177	----	----	----	----	35.4	34.2	27.9	37.5	35.0	44.2	50.0	45.0	37.5	----	----	----	----	----	----	----	----	----	----	----	----	----	9	38.5	95.3
Nugent	176	----	----	----	----	33.3	31.7	47.9	39.6	34.2	45.0	40.0	47.5	52.5	64.2	41.7	31.7	27.9	35.0	45.8	46.7	54.2	50.0	53.3	45.8	56.3	39.7	22	43.8	105.0

Pioneer	2677	----	----	----	----	33.3	42.5	30.0	44.2	50.0	35.8	45.8	44.2	44.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	41.1	101.7
Victor	179	----	----	----	----	29.2	30.0	26.7	35.8	29.2	47.5	28.3	30.8	47.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	33.9	83.9
Vanguard	2665	----	----	----	----	27.9	40.4	37.1	46.7	38.3	47.5	40.0	47.5	50.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	41.7	103.2
Monck	2703	----	----	----	----	----	30.8	17.2	23.7	25.0	47.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	28.8	75.2
California Prolific	2649	----	----	----	----	----	29.2	31.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	30.3	86.1
Rigid	2682	----	----	----	----	----	22.9	19.2	21.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	21.3	58.2
Success	2707	----	----	----	----	----	45.8	44.5	34.6	36.7	35.8	33.3	49.2	49.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	8	41.1	99.3
Excelsior	2684	----	----	----	----	----	45.0	38.2	37.4	33.3	26.7	40.0	50.0	51.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	8	40.3	97.3
Champion	2683	----	----	----	----	----	42.4	47.9	37.9	25.0	32.7	50.8	47.5	45.8	49.2	38.3	38.3	25.8	27.5	37.5	----	----	----	----	----	----	----	----	14	39.0	93.7
Nepean	183	----	----	----	----	----	----	42.1	40.8	28.3	50.8	40.0	37.5	43.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	7	40.4	96.7
Pacer	2667	----	----	----	----	----	----	28.3	37.1	25.8	40.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	33.0	85.9
Silver King	890	----	----	----	----	----	----	----	41.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	41.7	106.4
Empire	2680	----	----	----	----	----	----	----	----	34.2	39.2	36.7	46.7	55.0	65.8	45.0	41.7	35.8	40.8	34.2	----	----	----	----	----	----	----	----	11	43.2	100.7
Mansfield	2241	----	----	----	----	----	----	----	----	33.3	50.8	50.0	40.0	56.7	55.8	37.5	30.8	35.4	32.5	41.7	43.3	52.5	----	----	----	----	----	----	13	43.1	99.8
Argyle	2681	----	----	----	----	----	----	----	----	32.5	59.2	40.0	48.3	52.5	54.2	35.8	37.5	38.3	40.0	----	----	----	----	----	----	----	----	----	10	43.8	102.1
Dunham	2670	----	----	----	----	----	----	----	----	32.5	45.8	44.2	30.8	40.0	49.2	44.2	34.6	30.0	45.0	----	----	----	----	----	----	----	----	----	10	39.6	92.3
Leslie	2669	----	----	----	----	----	----	----	----	26.7	44.2	25.0	39.2	33.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	33.7	77.3
Logan	2668	----	----	----	----	----	----	----	----	25.8	44.2	39.2	35.8	42.5	45.8	41.7	38.3	35.0	42.5	----	----	----	----	----	----	----	----	----	10	39.1	91.1
Yale	1592	----	----	----	----	----	----	----	----	----	50.8	53.3	50.8	52.5	53.3	47.0	33.3	32.5	33.3	36.7	48.1	48.7	----	----	----	----	----	----	12	45.0	102.0
Garfield	2673	----	----	----	----	----	----	----	----	----	55.0	43.3	45.8	58.3	50.0	42.5	----	----	----	----	----	----	----	----	----	----	----	----	6	49.1	106.7
Brome	2679	----	----	----	----	----	----	----	----	----	50.0	32.8	45.0	50.0	53.3	44.2	49.2	30.4	----	----	----	----	----	----	----	----	----	----	8	44.4	100.2
Claude	1557	----	----	----	----	----	----	----	----	----	45.8	29.2	52.5	49.2	48.3	41.7	31.3	38.3	31.7	40.4	40.8	46.7	----	----	----	----	----	----	12	41.3	93.7
Blue Long Head	2685	----	----	----	----	----	----	----	42.5	33.3	40.8	25.0	38.3	40.0	----	----	----	40.0	36.1	42.5	----	----	----	----	----	----	----	----	9	37.6	89.3
Black Hull-less	596	----	----	----	----	----	----	----	----	----	40.8	20.8	50.8	48.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	40.2	88.2
Clifford	1910	----	----	----	----	----	----	----	----	----	50.8	45.0	33.3	44.2	42.5	35.0	33.3	44.2	43.3	42.5	40.0	47.5	49.2	----	----	----	----	----	13	42.4	95.9
Harvey	2675	----	----	----	----	----	----	----	----	----	53.3	40.8	36.7	45.0	40.8	36.7	39.2	32.5	----	----	----	----	----	----	----	----	----	----	8	40.6	91.6
Fulton	2706	----	----	----	----	----	----	----	----	----	44.2	32.5	30.0	37.5	48.3	32.1	----	----	----	----	----	----	----	----	----	----	----	----	6	37.4	81.3
Jarvis	2672	----	----	----	----	----	----	----	----	----	51.7	25.8	27.5	40.0	40.0	21.7	36.7	36.3	25.8	48.3	30.8	50.8	43.3	----	----	----	----	----	13	36.8	83.3
Albert	1551	----	----	----	----	----	----	----	----	----	44.2	57.5	50.0	47.5	59.2	40.0	49.2	39.2	34.2	38.3	45.8	43.3	50.8	----	----	----	----	----	13	46.1	104.3
Kirby	2671	----	----	----	----	----	----	----	----	----	50.0	----	40.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	45.4	101.3
Nepal	595	----	----	----	----	----	----	----	----	----	35.0	----	46.7	44.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	42.0	91.7
Standwell	584	----	----	----	----	----	----	----	----	----	----	----	45.0	47.5	52.5	27.5	25.0	33.7	40.0	42.9	39.2	43.3	40.8	----	----	----	----	----	11	39.8	90.7
Gordon	2674	----	----	----	----	----	----	----	----	----	----	----	36.7	40.8	46.7	21.7	35.8	34.6	36.7	47.5	40.8	----	----	----	----	----	----	----	9	37.9	87.1
Invincible	590	----	----	----	----	----	----	----	----	----	----	----	35.8	39.2	55.8	31.5	35.4	38.3	34.2	43.3	41.3	59.2	47.5	41.7	38.3	48.7	46.3	15	42.4	96.1
Chevalier II	200	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	25.4	50.0	47.5	40.8	58.3	51.7	56.7	61.7	50.0	65.0	44.4	11	50.1	118.7
O. A. C. 21	1470	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	49.2	48.4	59.2	34.8	46.3	41.3	6	46.5	100.9
Hannchen	531	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	25.0	39.2	57.5	36.7	----	----	4	39.6	85.5
Manchurian	739	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	42.9	40.0	29.2	54.0	34.4	5	40.1	88.1
Gold	1145	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	58.1	46.6	2	52.3	115.2

TABLE 2.—*Annual acre yields of varieties of barley grown at the experimental farm for Nova Scotia (at Nappan) in part or all of the 26 years from 1890 to 1915, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			French Chevalier	Canadian Thorpe	Hannchen	Mensury	Petschora	Odessa	Blue Long Head	Nepal	Stella	Success
French Chevalier.	175	Years comparable	------	23	4	19	9	24	9	3	22	8
		Percentage yield	------	120. 3	124. 2	94. 4	115. 4	107. 1	132. 8	131. 8	109. 0	111. 2
Canadian Thorpe.	740	Years comparable	23	------	4	18	9	23	9	3	22	8
		Percentage yield	83. 1	------	99. 9	80. 8	104. 9	91. 8	111. 6	115. 8	90. 1	102. 3
Hannchen	531	Years comparable	4	4	------	1	(*)	4	(*)	(*)	4	(*)
		Percentage yield	80. 5	100. 1	------	50. 0	------	87. 4	------	------	83. 7	------
Mensury	2657	Years comparable	19	18	1	------	9	20	9	3	17	8
		Percentage yield	105. 9	123. 7	200. 0	------	129. 9	108. 0	130. 0	129. 1	109. 0	127. 1
Petschora	2658	Years comparable	9	9	(*)	9	------	10	6	3	9	8
		Percentage yield	86. 6	95. 4	------	77. 0	------	86. 6	118. 8	106. 6	89. 7	96. 4
Odessa	182	Years comparable	24	23	4	20	10	------	9	3	22	8
		Percentage yield	93. 3	109. 0	114. 5	92. 6	115. 5	------	124. 2	125. 1	98. 4	112. 8
Blue Long Head.	2685	Years comparable	9	9	(*)	9	6	9	------	3	9	6
		Percentage yield	75. 3	89. 6	------	76. 9	84. 2	80. 5	------	94. 6	86. 3	92. 1
Nepal	595	Years comparable	3	3	(*)	3	3	3	3	------	3	3
		Percentage yield	75. 9	86. 4	------	77. 5	93. 8	79. 9	105. 7	------	88. 9	93. 8
Stella	2678	Years comparable	22	22	4	17	9	22	9	3	------	8
		Percentage yield	91. 7	111. 0	119. 4	91. 7	111. 4	101. 6	115. 9	112. 5	------	106. 7
Success	2707	Years comparable	8	8	(*)	8	8	8	6	3	8	------
		Percentage yield	89. 9	97. 8	------	78. 7	103. 8	88. 6	108. 6	106. 6	93. 7	------

KENTVILLE, NOVA SCOTIA

At Kentville, Nova Scotia, only two varieties were reported tested before 1915. During the years 1914 and 1915, as shown in Table 3, Manchurian (C. I. No. 739) proved to be slightly better than Canadian Thorpe (C. I. No. 740). A test of only two years is of little significance; but here, as at Nappan, the Manchurian was superior to Canadian Thorpe.

TABLE 3.—*Annual acre yields of varieties of barley grown at the experimental station for Annapolis and Cornwallis Valleys (at Kentville, Nova Scotia) in 1914 and 1915*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)		Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915			
Manchurian	739	24. 3	22. 4	2	23. 1	101. 8
Canadian Thorpe	740	22. 2	21. 7	2	21. 9	96. 5

FREDERICTON, NEW BRUNSWICK

Five barleys were grown at Fredericton, New Brunswick, in 1915. The yields are reported in Table 4. Four of the varieties were introduced into experiment-station tests in recent years. The best of the five was Gold (C. I. No. 1145). Second in yield came O. A. C. 21 (C. I. No. 1470), while Early Chevalier (C. I. No. 2725), Manchurian (C. I. No. 739), and Canadian Thorpe (C. I. No. 740), were third, fourth, and fifth, respectively.

TABLE 4.—*Annual acre yields of varieties of barley grown at the experimental station for New Brunswick (at Fredericton) in the year 1915*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yield (bus.)	Percentage of weighted mean
Early Chevalier	2725	41. 0	103. 0
Gold	1145	46. 0	115. 6
O. A. C. 21	1470	43. 0	108. 0
Manchurian	739	40. 0	100. 5
Canadian Thorpe	740	29. 0	72. 9

STE. ANNE DE LA POCATIERE, QUEBEC

To 1921 the only yields published from Ste. Anne de la Pocatiere were those of Manchurian (C. I. No. 739) and Success (C. I. No. 2707) grown in 1915. The yield of Manchurian was 37 bushels and that of Success only 31 bushels.

TABLE 5.—*Annual acre yields of varieties of barley grown at the experimental station for central Quebec (at Cap Rouge) in one or more of the five years from 1911 to 1915, inclusive.*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1911	1912	1914	1915			
Escourgeon	2716	36. 3	18. 7	--------	--------	2	27. 5	108. 3
Odessa	182	29. 4	25. 0	--------	--------	2	27. 2	107. 1
Success	2707	27. 2	22. 5	14. 2	--------	3	21. 3	88. 7
Manchurian	739	26. 9	21. 3	13. 7	40. 0	4	25. 5	95. 9
Stella	2678	24. 4	25. 0	--------	--------	2	24. 7	97. 2
Black Japan	2717	20. 6	12. 5	--------	--------	2	16. 5	65. 0
O. A. C. 21	1470	13. 7	18. 7	12. 3	43. 0	4	21. 9	82. 3
Chevalier II	200	41. 3	--------	--------	--------	1	41. 3	137. 2
Early Chevalier	2725	40. 0	28. 7	--------	41. 0	3	36. 6	130. 7
Hannchen	531	35. 0	12. 5	--------	--------	2	23. 7	93. 3
Beaver	1915	33. 7	--------	--------	--------	1	33. 7	112. 0
Svanhals	187	33. 1	8. 7	--------	--------	2	20. 9	82. 3
Duckbill	1916	29. 7	--------	--------	--------	1	29. 7	98. 7
Gold	1145	--------	--------	--------	46. 0	1	46. 0	115. 6
Canadian Thorpe	740	--------	--------	--------	29. 0	1	29. 0	72. 9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF EIGHT REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages							
			Early Chevalier	Duckbill	Svanhals	Hannchen	Manchurian	Odessa	Stella	Success
Early Chevalier.	2725	Years comparable	-------	1	2	2	3	2	2	2
		Percentage yield	-------	134. 7	164. 4	144. 6	124. 4	126. 3	139. 1	138. 2
Duckbill	1916	Years comparable	1	-------	1	1	1	1	1	1
		Percentage yield	74. 3	-------	89. 7	84. 9	110. 4	101. 0	121. 7	109. 2
Svanhals	187	Years comparable	2	1	-------	2	2	2	2	2
		Percentage yield	60. 8	111. 4	-------	88. 0	86. 7	76. 8	84. 6	84. 1
Hannchen	531	Years comparable	2	1	2	-------	2	2	2	2
		Percentage yield	69. 1	117. 8	113. 6	-------	98. 5	87. 3	96. 2	95. 6
Manchurian	739	Years comparable	3	1	2	2	-------	2	2	3
		Percentage yield	80. 4	90. 6	115. 3	101. 5	-------	88. 6	97. 6	96. 9
Odessa	182	Years comparable	2	1	2	2	2	-------	2	2
		Percentage yield	79. 2	99. 0	130. 1	114. 5	112. 9	-------	110. 1	109. 5
Stella	2678	Years comparable	2	1	2	2	2	2	-------	2
		Percentage yield	71. 9	82. 2	118. 2	104. 0	102. 5	90. 8	-------	99. 4
Success	2707	Years comparable	2	1	2	2	3	2	2	-------
		Percentage yield	72. 3	91. 6	118. 9	104. 6	103. 2	91. 4	100. 6	-------

CAP ROUGE, QUEBEC

During one or more of the five years from 1911 to 1915, inclusive, 15 varieties of barley were tested at Cap Rouge, Quebec. Only two of these varieties were grown for as many as four of the five years. The results are reported in Table 5. Early Chevalier (C. I. No. 2725) was undoubtedly the best variety for the three years in which it was tested. The indications are that the Chevalier barleys are well adapted to this section of Quebec. The summarized digest of Table 5 shows that Duckbill (C. I. No. 1916) and Odessa (C. I. No. 182) ranked high among the varieties. These two have been widely tested at Canadian stations and have given good yields at many places. Gold (C. I. No. 1145) grown only in 1915 produced the highest yield in that year.

OTTAWA, ONTARIO

The Central Experimental Farm of Canada is located at Ottawa, Ontario. The other Dominion experimental farms are under the direct supervision of this institution. Most of the barleys tested at these farms were received from the farm at Ottawa. The many hybrids tested at the various stations were produced by Dr. C. E. Saunders, of that farm.

The work at Ottawa began in 1889. Table 6 shows that 15 varieties were tested in that year. Barley was grown in all but one of the years from 1889 to 1915, inclusive. In all, nearly 150 varieties were tested. Although this large number makes inspection of the data difficult, it is obvious that barleys of the Manchuria and Odessa types are the highest yielding sorts at Ottawa. The Chevalier barleys are not particularly good, although Early Chevalier (C. I. No. 2725) has shown promise since its introduction in 1907. From the column of percentages it is evident that a number of hybrid sorts have given good yields. Among the best of these are Stella (C. I. No. 2678), Trooper (C. I. No. 173), Nugent (C. I. No. 176), and Albert (C. I. No. 1551). Among the widely tested varieties which do not yield well at Ottawa are Chevalier II (C. I. No. 200), Invincible (C. I. No. 590), and Standwell (C. I. No. 584).

Nine groups of barleys were compared. The number in the groups varied from only 2 in Coast and Nudum to 40 in the Hybrid. The groups ranked as follows: Manchuria, Hybrid, Hanna, Nudum, Coast, Thorpe, Polar, Chevalier, and Himalaya. The Manchuria was much better than any of the other groups compared. The high yields of the hybrids may have been due to the fact that they were developed at Ottawa and selected for yield at that place. They probably have done relatively better at this place than at the other stations. The Hanna barleys produced almost as much as the hybrids. The Nudum group was represented by only two varieties and therefore probably stands too high as a group. The high yield of the Nudum barleys is due to the unusual productivity of Caucasian (C. I. No. 2724). This is a 2-rowed naked sort, similar to the Baku grown at a number of western experiment stations in the United States. Its yield is especially interesting, inasmuch as the naked oats have yielded exceptionally well at Ottawa.

Ten well-known varieties are compared in the summarized digest of Table 6. Odessa (C. I. No. 182) is the best of the 10 compared in this table. Mensury (C. I. No. 2657), Hannchen (C. I. No. 531), Stella (C. I. No. 2678), and Svanhals (C. I. No. 187) follow in order. Blue Long Head (C. I. No. 2685) was relatively better here than at Nappan. The climatic conditions at Ottawa are not only more favorable to the growth of Manchuria varieties and less favorable to the Chevalier barleys than is the case in eastern Canada but also are such that barleys suited to the arid regions grow quite well. Neither the Chevalier nor the Thorpe groups were at their best, although the former were better than the latter. It is unfortunate that only a limited number of varieties can be compared in this way, as it resulted in eliminating several very promising sorts from the comparison. Manchurian (C. I. No. 739), Gold (C. I. No. 1145), and O. A. C. 21 (C. I. No. 1470) have been particularly promising since their introduction in the more recent years.

TABLE 6.—*Annual acre yields of varieties of barley grown at the Central Experimental Farm, Ottawa, Ontario, in one or more of the 27 years from 1889 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)																										Years grown	Average yield (bus.)	Percentage of weighted mean
		1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1915			
Selected Chevalier	2662	31.1	24.0	41.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	32.2	95.8
Beardless	2646	50.1	26.3	34.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	37.0	110.1
Danish Chevalier	180	31.1	23.7	41.8	35.0	18.7	29.4	27.7	50.2	34.8	50.0	47.1	51.7	47.1	64.2	37.1	32.9	62.9	52.9	38.1	31.9	50.0	24.4	----	----	----	----	22	40.1	95.9
Prentice	917	36.3	26.7	49.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	37.5	111.6
Early Minting	2661	25.7	19.0	42.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	29.1	86.6
English Malting	2654	34.3	24.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	29.3	111.0
Golden Melon	411	26.0	18.3	43.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	29.4	87.5
Prize Prolific	169	31.5	27.7	33.4	27.5	15.8	25.8	28.1	41.9	22.5	43.3	28.7	27.0	31.3	46.7	----	----	----	----	----	----	----	----	----	----	----	----	14	30.8	78.2
New Zealand	2656	26.5	----	42.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	34.3	92.7
Saale	2645	22.0	24.3	47.4	28.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	30.5	92.4
Peerless White	2647	36.5	20.4	37.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	31.3	93.2
Baku	333	26.0	28.5	27.5	26.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	27.1	82.1
Mensury	2657	22.0	20.7	45.7	36.7	47.5	44.4	58.1	61.0	49.4	55.0	44.2	60.0	39.2	64.2	38.7	42.5	71.3	67.1	33.7	44.4	45.6	77.5	----	----	----	----	22	48.6	116.3
Polar	2653	34.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	34.5	111.7
Petschora	2658	30.0	19.3	32.3	29.2	15.4	30.4	51.9	45.8	43.7	37.5	50.8	54.2	27.7	53.3	----	----	----	----	----	----	----	----	----	----	----	----	14	37.3	94.7
Goldthorpe	327	----	14.5	49.6	27.1	12.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	35.0	56.3	6	32.5	88.6
Baxter	185	----	25.0	40.0	24.2	29.2	25.8	40.2	60.0	35.2	35.0	38.3	41.7	24.4	35.0	45.0	46.7	----	----	----	----	----	----	----	----	----	----	15	36.4	91.9
Spiti Valley	2664	----	21.3	22.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	21.8	63.6
Odessa	182	----	18.3	43.5	29.2	38.5	41.7	47.5	69.2	54.0	58.3	47.9	55.0	41.0	65.0	44.6	43.3	66.3	----	54.4	49.4	61.9	----	----	----	----	----	19	48.9	120.7
Peacock	2666	----	----	43.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	43.4	110.7
Rennie Improved	181	----	25.7	41.7	27.5	34.2	23.3	32.3	47.1	46.5	41.3	50.4	45.4	29.4	49.2	42.9	40.0	43.3	----	----	----	----	----	----	----	----	----	16	38.8	95.8
Bestehorn	331	----	----	46.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	46.6	118.9
Dutch	2687	----	----	41.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	41.9	106.9
Italian	342	----	----	49.7	32.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	41.1	113.5
Kinver Chevalier	587	----	----	42.7	34.2	20.4	24.6	26.9	49.2	19.6	38.3	35.4	37.9	36.5	60.0	----	----	----	----	----	----	----	----	----	----	----	----	12	35.5	88.3
Golden Grain	588	----	----	32.7	32.2	17.9	20.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	25.7	78.8
Odessa	2737	----	----	31.2	30.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	30.6	84.5
Phoenix Von Thalen	325	----	----	54.7	40.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	47.3	130.7
Fan	341	----	----	34.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	34.4	87.8
Sharpe Chevalier	2650	----	----	43.3	----	30.0	26.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	33.3	100.6
Swedish	2655	----	----	48.3	45.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	46.7	129.0
Thanet	2652	----	----	41.8	----	40.8	25.6	21.9	44.6	21.3	38.1	33.3	30.8	21.3	24.2	----	----	----	----	----	----	----	----	----	----	----	----	11	31.2	76.8
Common	184	----	----	46.5	36.7	41.7	37.5	44.0	54.8	40.0	40.4	52.5	59.2	26.0	50.8	44.6	43.7	65.4	53.7	----	----	----	----	----	----	----	----	16	46.1	109.8
Himalaya	1934	----	----	45.3	20.0	16.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	27.2	80.5
Greek	336	----	----	24.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	24.9	63.5
Black Hull-less	596	----	----	34.5	----	----	----	----	----	----	----	46.7	48.7	9.8	63.3	25.4	37.1	50.0	50.4	35.0	----	----	----	----	----	----	----	10	40.1	91.8
Kangra Valley	2689	----	----	29.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	29.6	75.5

TABLE 6.—*Annual acre yields of varieties of barley grown at the Central Experimental Farm, Ottawa, Ontario, in one or more of the 27 years from 1889 to 1915, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																										Years grown	Average yield (bus.)	Percentage of weighted mean
		1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1915			
Lahoul	2690	----	----	25.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	25.1	64.0
Moulton	2697	----	----	26.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	26.8	68.4
Mardan	2696	----	----	30.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	30.5	77.8
Oderbrucker	2700	----	----	51.7	27.1	25.8	31.0	47.3	48.5	48.1	46.9	49.2	52.5	26.0	52.5	42.9	36.7	68.3	42.5	42.5	48.7	60.5	71.3	53.1	30.0	18.7	46.3	24	44.5	104.7
Palampur	2691	----	----	38.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	38.9	99.2
Sialkot	2695	----	----	34.5	19.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	26.9	74.3
Simla	2692	----	----	34.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	34.5	88.0
Seoraj	2693	----	----	34.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	34.5	88.0
French Chevalier	175	----	----	----	33.3	27.3	26.5	34.4	45.8	24.6	36.9	47.5	56.7	55.2	68.3	44.6	44.2	60.0	57.9	27.5	28.7	48.1	45.0	48.1	----	60.0	55.0	22	44.3	103.7
Duckbill	1916	----	----	----	40.4	18.3	25.8	37.5	39.6	----	----	----	----	16.3	56.7	----	----	----	----	----	----	----	----	----	----	----	----	7	33.5	87.0
Canadian Thorpe	740	----	----	----	31.3	15.8	23.3	25.8	49.6	38.5	47.3	46.7	58.3	45.2	62.5	46.7	44.2	42.5	56.3	48.1	36.3	45.0	----	----	----	----	----	18	42.4	101.2
Norway House	2699	----	----	----	28.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	28.3	91.6
Victor	179	----	----	----	----	30.2	23.1	33.5	46.7	34.6	39.2	44.6	49.2	21.9	48.3	----	----	----	----	----	----	----	----	----	----	----	----	10	37.1	91 2
Newton	172	----	----	----	----	19.2	27.1	29.4	51.0	41.2	36.7	30.8	50.0	----	50.8	31.3	33.7	33.3	----	----	----	----	----	----	----	----	----	12	36.2	84.2
Summit	174	----	----	----	----	35.0	----	39.6	59.0	41.8	40.4	48.3	54.2	25.2	47.5	54.6	43.3	63.7	51.7	40.0	----	----	----	----	----	----	----	14	46.0	107.2
Surprise	171	----	----	----	----	28.3	----	36.3	41.0	38.3	44.8	30.8	51.7	----	63.3	----	----	----	----	----	----	----	----	----	----	----	----	8	41.8	95.7
Bolton	177	----	----	----	----	----	30.8	35.5	51.0	31.5	43.1	38.3	52.5	25.2	53.3	----	----	----	----	----	----	----	----	----	----	----	----	9	40.1	96.9
California Prolific	2649	----	----	----	----	----	27.1	26.0	39.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	30.9	75.7
Sidney	178	----	----	----	----	----	21.9	43.3	46.3	35.9	33.7	50.0	45.0	31.5	46.7	39.2	30.4	42.5	52.9	26.9	34.4	----	----	----	----	----	----	15	38.7	90.8
Royal	1252	----	----	----	----	----	36.0	51.3	62.1	48.1	52.7	50.0	58.2	33.5	47.5	41.3	34.2	54.6	41.7	----	----	----	----	----	----	----	----	13	47.0	109.0
Vanguard	2665	----	----	----	----	----	34.8	44.6	46.7	44.3	36.7	47.1	52.9	27.7	50.8	----	----	----	----	----	----	----	----	----	----	----	----	9	42.8	103.4
Phoenix	2676	----	----	----	----	----	33.5	37.3	58.7	41.2	45.0	40.0	41.7	25.2	36.7	----	----	----	----	----	----	----	----	----	----	----	----	9	39.9	96.4
Pioneer	2677	----	----	----	----	----	33.5	42.7	56.7	50.8	57.1	50.8	60.0	27.7	60.0	----	----	----	----	----	----	----	----	----	----	----	----	9	48.8	117.9
Stella	2678	----	----	----	----	----	31.0	46.0	55.0	45.5	47.1	46.7	43.7	36.9	65.8	51.3	58.3	55.4	47.1	50.6	56.7	35.0	68.7	45.6	44.4	26.9	51.3	21	48.0	110.9
Trooper	173	----	----	----	----	----	30.8	46.9	59.0	48.9	38.7	49.2	47.1	25.2	65.8	52.1	27.1	69.2	69.8	31.9	49.4	40.6	59.4	----	----	----	----	17	47.7	110.4
Nugent	176	----	----	----	----	----	22.7	42.9	50.2	43.1	41.5	50.0	50.0	33.1	60.8	42.1	50.0	72.5	65.0	46.9	46.3	58.7	62.5	51.9	26.9	----	----	19	48.3	112.1
Nepean	183	----	----	----	----	----	----	37.7	45.6	31.6	37.7	45.4	49.2	41.0	46.7	----	----	----	----	----	----	----	----	----	----	----	----	8	41.9	99.3
Pacer	2667	----	----	----	----	----	----	36.3	48.1	32.9	33.1	41.9	43.3	26.9	48.3	----	----	----	----	----	----	----	----	----	----	----	----	8	38.9	92.2
Beaver	1915	----	----	----	----	----	----	35.0	44.2	34.2	55.4	49.2	54.2	46.0	52.5	42.5	31.7	47.5	57.5	38.1	36.9	50.0	----	----	----	----	----	15	45.0	104.2
Prolific	2738	----	----	----	----	----	----	30.8	40.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	35.8	80.8
Suffolk Chevalier	2701	----	----	----	----	----	----	30.2	44.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	37.5	84.7
Success	2707	----	----	----	----	----	----	51.3	44.0	44.3	37.5	41.7	50.8	16.3	50.8	----	----	----	----	----	----	----	----	----	----	----	----	8	42.1	99.8
Monck	2703	----	----	----	----	----	----	28.7	36.9	18.5	27.7	45.4	35.8	14.6	46.7	----	----	----	----	----	----	----	----	----	----	----	----	8	31.8	75.4
Suffolk Chevalier	2702	----	----	----	----	----	----	28.7	44.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	36.5	82.4
Logan	2668	----	----	----	----	----	----	----	47.9	38.6	35.4	45.4	43.3	39.4	54.2	37.1	20.0	50.0	----	32.5	----	----	----	----	----	----	----	11	40.3	94.6
Leslie	2669	----	----	----	----	----	----	----	46.6	35.6	45.8	45.8	40.8	11.0	39.2	----	----	----	----	----	----	----	----	----	----	----	----	7	37.8	88.9
Douglas	2704	----	----	----	----	----	----	----	46.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	46.3	95.5
Dunham	2670	----	----	----	----	----	----	----	46.2	37.4	46.0	45.0	49.2	30.6	53.3	37.9	15.0	40.8	53.7	34.4	----	----	----	----	----	----	----	12	40.8	93.4
Kirby	2671	----	----	----	----	----	----	----	45.6	38.4	31.2	47.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	40.6	94.6

Jarvis	2672	----	----	----	----	----	----	----	45.1	31.2	50.1	44.2	50.4	31.9	45.0	46.3	35.8	46.3	57.1	40.6	26.3	34.4	44.4	43.7	----	28.7	37.5	18	41.1	93.2
Gordon	2674	----	----	----	----	----	----	----	38.7	29.4	28.3	40.8	50.8	34.0	55.8	41.7	39.6	41.3	56.7	25.6	31.3	45.0	51.3	51.3	----	36.3	60.0	18	42.1	95.5
Harvey	2675	----	----	----	----	----	----	----	38.6	29.6	34.0	30.0	50.0	14.8	48.3	40.0	29.6	50.0	48.7	----	----	----	----	----	----	----	----	11	37.6	85.5
Rigid	2682	----	----	----	----	----	----	----	34.8	14.2	26.7	36.9	29.2	14.6	22.5	----	----	----	----	----	----	----	----	----	----	----	----	7	25.6	60.1
Champion	2683	----	----	----	----	----	----	----	61.3	40.2	33.3	40.8	45.8	----	45.8	40.4	22.5	40.0	32.5	35.0	44.4	----	----	----	----	----	----	12	40.2	89.3
Excelsior	2684	----	----	----	----	----	----	----	57.5	40.8	36.0	36.7	46.7	17.7	48.3	----	----	----	----	----	----	----	----	----	----	----	----	7	40.5	95.3
Mansfield	2241	----	----	----	----	----	----	----	53.7	49.5	51.7	45.4	45.0	----	46.7	34.6	17.9	46.7	57.9	33.1	37.5	51.9	57.5	----	----	----	----	14	44.9	98.7
Yale	1592	----	----	----	----	----	----	----	49.5	32.5	49.6	47.5	41.7	26.0	73.3	45.0	45.4	49.6	58.3	15.6	41.3	40.6	----	----	----	26.9	43.7	16	42.9	98.4
Albert	1551	----	----	----	----	----	----	----	49.2	43.0	40.4	34.2	53.3	26.9	47.5	47.1	36.3	70.8	77.1	35.6	30.0	62.5	77.5	60.0	34.4	----	31.3	18	47.6	107.9
Brome	2679	----	----	----	----	----	----	----	48.7	33.0	49.6	41.3	40.8	21.9	60.8	53.7	37.5	61.3	42.5	----	----	----	----	----	----	----	----	11	44.6	101.4
Empire	2680	----	----	----	----	----	----	----	47.3	47.2	35.0	34.2	43.7	22.7	46.7	45.4	41.3	42.1	62.5	45.6	37.5	----	----	----	----	----	----	13	42.4	97.7
Blue Long Head	2685	----	----	----	----	----	----	----	47.1	42.7	50.1	46.3	43.3	31.9	74.2	58.7	41.3	43.7	61.7	48.1	32.5	----	----	----	----	----	----	13	47.8	110.1
Claude	1557	----	----	----	----	----	----	----	46.7	37.1	44.2	52.1	51.7	36.9	37.5	35.8	43.3	62.5	51.3	35.0	45.0	63.7	56.3	----	----	----	----	15	46.6	106.2
Blue Short Head	2686	----	----	----	----	----	----	----	45.8	----	----	42.1	50.1	11.3	27.5	----	----	----	----	----	----	----	61.3	43.7	22.5	35.0	40.0	10	37.9	85.2
Garfield	2673	----	----	----	----	----	----	----	44.4	31.0	37.3	43.3	43.7	26.5	55.0	52.1	40.8	----	----	----	----	----	----	----	----	----	----	9	41.6	99.3
Argyle	2681	----	----	----	----	----	----	----	43.3	47.7	49.2	46.3	56.7	21.9	51.7	34.6	43.3	56.3	62.1	25.6	----	----	----	----	----	----	----	12	44.9	102.7
Warren	2688	----	----	----	----	----	----	----	----	33.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	33.1	88.0
Monde Hull-less	2705	----	----	----	----	----	----	----	----	36.0	----	38.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	37.3	91.9
Clifford	1910	----	----	----	----	----	----	----	----	----	41.7	44.6	50.0	41.9	46.7	36.7	32.5	53.3	54.6	47.5	42.5	49.4	31.9	41.3	----	33.1	49.4	16	43.6	98.6
Fulton	2706	----	----	----	----	----	----	----	----	----	35.8	46.7	47.9	20.2	55.0	37.1	32.9	----	----	----	----	----	----	----	----	----	----	7	39.4	94.9
Nepal	595	----	----	----	----	----	----	----	----	----	----	35.8	39.2	6.0	57.5	----	----	----	----	----	----	----	----	----	----	----	----	4	34.6	81.6
Pelham	2708	----	----	----	----	----	----	----	----	----	----	----	42.5	26.3	52.5	34.6	28.7	----	----	----	----	----	----	----	----	----	----	5	36.9	89.8
Silver King	890	----	----	----	----	----	----	----	----	----	----	----	58.3	24.6	55.8	53.3	26.3	58.7	----	----	----	----	----	----	----	----	----	6	46.2	107.9
Parkin	2709	----	----	----	----	----	----	----	----	----	----	----	50.8	29.4	45.8	----	----	----	----	----	----	----	----	----	----	----	----	3	42.0	99.8
Monro	2710	----	----	----	----	----	----	----	----	----	----	----	50.8	35.2	50.8	----	----	----	----	----	----	----	----	----	----	----	----	3	45.6	108.3
Lytton	2711	----	----	----	----	----	----	----	----	----	----	----	47.1	26.0	49.2	----	----	----	----	----	----	----	----	----	----	----	----	3	40.8	96.9
Standwell	584	----	----	----	----	----	----	----	----	----	----	----	----	42.7	50.0	35.0	41.7	54.2	67.9	40.6	29.4	43.7	43.7	40.0	----	25.0	56.9	13	43.9	99.3
Plumage	3	----	----	----	----	----	----	----	----	----	----	----	----	34.6	41.7	43.3	28.7	----	----	----	----	----	----	----	----	----	----	4	37.1	93.9
Invincible	590	----	----	----	----	----	----	----	----	----	----	----	----	29.6	45.8	46.7	36.7	45.0	62.5	46.9	24.4	35.0	48.7	34.4	----	40.6	58.1	13	42.6	96.4
Chevalier II	200	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	47.5	50.8	56.3	54.4	38.7	31.9	40.0	39.4	----	35.6	63.1	10	45.8	99.8
Fichtel Mountain	2712	----	----	----	----	----	----	----	----	----	----	----	----	22.1	60.8	39.6	32.1	56.3	52.9	----	----	----	----	----	----	----	----	6	43.9	99.5
Bestehorn Kaiser	2713	----	----	----	----	----	----	----	----	----	----	----	----	20.4	41.7	43.7	43.3	53.7	----	----	----	----	----	----	----	----	----	5	40.6	97.1
Oregon	2736	----	----	----	----	----	----	----	----	----	----	----	----	18.7	45.8	----	----	----	----	----	----	----	----	----	----	----	----	2	32.3	81.4
Norway 8	213	----	----	----	----	----	----	----	----	----	----	----	----	34.4	45.0	44.6	34.2	42.1	----	----	----	----	----	----	----	----	----	5	40.1	95.9
Princess	529	----	----	----	----	----	----	----	----	----	----	----	----	29.6	58.3	48.3	42.9	43.9	48.8	38.8	38.1	40.0	----	----	----	----	----	9	43.2	100.2
Salzer Beardless	642	----	----	----	----	----	----	----	----	----	----	----	----	27.7	44.2	----	----	----	----	----	----	----	----	----	----	----	----	2	35.9	90.4
Chinese Hull-less	2735	----	----	----	----	----	----	----	----	----	----	----	----	24.6	40.0	25.8	14.6	43.7	----	----	----	----	----	----	----	----	----	5	29.7	71.1
Chousk	2734	----	----	----	----	----	----	----	----	----	----	----	----	23.5	40.0	----	----	----	----	----	----	----	----	----	----	----	----	2	31.7	79.8
Sisolsk	89	----	----	----	----	----	----	----	----	----	----	----	----	16.0	50.8	38.7	44.2	51.7	64.6	43.7	----	----	----	----	----	----	----	7	44.2	101.6
Turkestan	2715	----	----	----	----	----	----	----	----	----	----	----	----	----	36.7	----	----	----	----	----	----	----	----	----	----	----	----	1	36.7	72.2
Maltster	585	----	----	----	----	----	----	----	----	----	----	----	----	----	----	48.7	21.3	43.3	46.7	39.4	----	----	----	----	----	----	----	5	39.9	87.5
Brewers Favorite	586	----	----	----	----	----	----	----	----	----	----	----	----	----	----	35.8	35.8	31.7	55.0	48.7	29.4	42.5	----	----	----	----	----	7	39.8	89.4
Escourgeon	2716	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	45.0	57.5	65.4	35.0	44.4	38.1	68.7	48.1	38.7	41.9	56.9	11	49.1	107.9
Black Japan	2717	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.7	60.8	72.9	39.4	35.6	40.6	76.3	51.3	35.6	61.9	22.5	11	49.0	107.8
Bere	2718	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	39.2	45.8	63.3	40.6	23.7	40.0	----	----	----	----	----	6	42.1	93.8
Eclipse	2719	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	32.1	42.1	55.0	34.4	16.9	38.7	----	----	----	----	----	6	36.5	81.3
Svanhals	187	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	46.3	65.0	62.9	46.3	31.9	35.0	50.0	51.3	----	33.7	67.5	10	49.0	106.8
Primus	532	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	42.5	47.9	45.0	45.6	31.9	35.0	43.7	36.9	----	30.0	61.3	10	42.0	91.5
Hannchen	531	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	32.5	58.3	75.0	64.4	44.4	39.4	47.5	53.7	----	40.6	----	9	50.6	111.5
Manchuria	244	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	61.3	70.0	47.5	46.3	52.5	77.5	----	----	----	----	6	59.2	123.8
Archer Chevalier	2720	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	52.1	52.5	14.4	36.9	38.1	----	----	----	----	----	5	38.8	82.9

TABLE 6.—*Annual acre yields of varieties of barley grown at the Central Experimental Farm, Ottawa, Ontario, in one or more of the 27 years from 1889 to 1915, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																									Years grown	Average yield (bus.)	Percentage of weighted mean
		1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1915			
Taganrog	2721	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	69.2	----	----	----	75.6	53.7	45.0	41.3	65.6	6	58.4	117.3
Manchurian	739	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	63.3	48.1	53.7	62.5	68.1	53.1	40.6	42.5	----	8	54.0	119.5
Small Blue Naked	2722	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	34.6	33.1	42.5	34.4	58.1	----	----	----	----	5	40.5	86.7
Erfurt White	1310	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	66.7	36.9	----	----	----	----	----	----	----	2	51.8	107.0
Old Irish	2723	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	59.6	50.6	38.1	34.4	----	----	----	----	----	4	45.7	101.3
Jewel	324	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	58.7	42.5	25.6	33.7	37.5	----	----	----	----	5	39.6	84.8
Hofbrau	338	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	48.7	52.5	29.4	26.9	35.0	----	----	----	----	5	38.5	82.4
Gambrinus	330	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	44.2	21.9	----	----	----	----	----	----	----	2	33.1	68.4
Caucasian	2724	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50.0	50.6	52.5	46.3	49.4	----	24.4	43.7	7	45.3	102.3
Black	2726	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	39.4	51.9	45.6	31.3	----	62.5	45.6	6	46.1	101.5
Early Chevalier	2725	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	49.4	35.6	54.4	53.7	55.0	----	41.9	60.0	7	50.0	112.9
Leader	2727	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	35.0	51.3	38.1	----	----	----	3	41.5	85.6
O. A. C. 21	1470	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	70.6	52.5	26.9	46.3	65.6	5	52.4	111.5
Early Indian	1576	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	43.7	33.7	14.4	14.4	60.6	5	33.4	71.1
Kutais	2728	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	60.6	58.1	----	37.5	47.5	4	50.9	104.9
Reed Triumph	889	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	26.3	45.0	63.1	58.7	4	48.3	109.5
Gold	1145	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	39.4	----	54.4	75.6	3	56.5	123.6
Himalaya	1934	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	30.0	39.4	46.9	3	38.8	89.4
Swedish Star	1701	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	55.6	1	55.6	105.9
Binder	1909	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	40.6	1	40.6	77.3

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			French Chevalier	Canadian Thorpe	Svanhals	Hann-chen	Mensury	Odessa	Blue Long Head	Nepal	Stella	Success
French Chevalier	175	Years comparable		18	10	9	19	17	13	4	20	8
		Percentage yield		100.5	96.9	92.0	82.9	81.8	96.2	164.4	94.9	109.7
Canadian Thorpe	740	Years comparable	18		6	6	18	17	13	4	16	8
		Percentage yield	99.5		94.8	86.8	84.5	81.5	100.1	153.6	92.8	111.0
Svanhals	187	Years comparable	10	6		9	7	5	5	(*)	10	(*)
		Percentage yield	103.2	105.5		92.7	88.3	81.5	111.0		98.8	
Hannchen	531	Years comparable	9	6	9		7	5	5	(*)	9	(*)
		Percentage yield	108.7	115.3	107.9		94.6	86.8	120.8		102.6	
Mensury	2657	Years comparable	19	18	7	7		19	13	4	17	8
		Percentage yield	120.7	118.3	113.2	105.7		97.1	107.9	149.9	106.6	128.0
Odessa	182	Years comparable	17	17	5	5	19		12	4	15	8
		Percentage yield	122.2	122.6	122.6	115.2	103.0		115.8	150.8	110.3	130.1
Blue Long Head	2685	Years comparable	13	13	5	5	13	12		4	13	7
		Percentage yield	104.0	99.9	90.1	82.8	92.7	86.4		141.3	94.1	117.6
Nepal	595	Years comparable	4	4	(*)	(*)	4	4	4		4	4
		Percentage yield	60.8	65.1			66.7	66.3	70.8		71.7	86.8
Stella	2678	Years comparable	20	16	10	9	17	15	13	4		8
		Percentage yield	105.4	107.8	101.2	97.5	93.8	90.7	106.2	139.4		114.9
Success	2707	Years comparable	8	8	(*)	(*)	8	8	7	4	8	
		Percentage yield	91.1	90.1			78.1	76.9	85.0	115.2	87.1	

BRANDON, MANITOBA

One of the first of the Canadian experimental farms to be established was that at Brandon, Manitoba. The testing of barley varieties commenced in 1889 at the Ottawa station. Brandon is much farther north as well as farther west. The summers are cooler, and there is less humidity at ripening time. Table 7 shows that Brandon is undoubtedly in the territory of the Manchuria group. In the percentage valuation of the varieties Mensury (C. I. No. 2657) and Odessa (C. I. No. 182), which were grown for almost the entire period of years, ranked very high. From the average yields shown it is evident that barley is highly productive in Manitoba. Mensury (C. I. No. 2657), for example, produced an average yield of 56.3 bushels for a period of 24 years. Several of the hybrid varieties gave good yields at Brandon. Among the best were Yale (C. I. No. 1592), Mansfield (C. I. No. 2241), Argyle (C. I. No. 2681), and Nugent (C. I. No. 176). Of the varieties which were introduced so late that they were tested in only a few years Garton 68 (C. I. No. 2740), Hannchen (C. I. No. 531), Manchurian (C. I. No. 739), and Gold (C. I. No. 1145), were among the best. The Chevalier barleys gave only average yields at Brandon. Danish Chevalier (C. I. No. 180) yielded nearly 100 per cent, French Chevalier (C. I. No. 175) 102 per cent, and Chevalier II (C. I. No. 200) 99 per cent of the weighted mean. The Thorpe varieties were more irregular than the Chevalier sorts, but on the whole produced slightly better yields.

Seven groups of barleys were compared, which ranked as follows: Manchuria, Thorpe, Hanna, Polar, Himalaya, Hybrid, and Chevalier. The Manchuria is outstanding as compared with the other groups. It is significant that a group of Polar barleys which are 6-rowed sorts adapted to regions north of the Manchuria barleys yielded well at Brandon.

Ten varieties of different types are compared in the summarized digest of Table 7. Mensury (C. I. No. 2657) was the best of these. Odessa (C. I. No. 182) and Hannchen (C. I. No. 531) were almost as good. Hannchen was tested for only four years, being introduced in 1910. The comparative yield of Blue Long Head (C. I. No. 2685) was low, as is usually the case where Manchuria yields well. Likewise, Nepal and Manchuria seldom do well at the same place.

TABLE 7.—*Annual acre yields of varieties of barley grown at the experimental farm for Manitoba (at Brandon) in one or more of the 27 years from 1889 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)																										Years grown	Average yield (bus.)	Percentage of weighted mean
		1889	1890	1891	1892	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915			
Danish Chevalier	180	13.8	51.7	68.3	51.3	23.1	41.5	41.3	30.4	37.1	50.6	28.5	19.2	44.0	29.0	53.7	60.8	51.9	70.5	50.8	50.4	61.5	----	----	----	----	----	21	44.3	99.8
Prentice	917	12.3	46.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	29.5	91.6
Duckbill	1916	10.8	48.3	75.2	54.6	29.0	57.1	----	22.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	7	42.5	104.4
Peerless White	2647	8.7	49.8	----	42.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	33.8	86.7
Beardless	2646	8.7	48.4	58.7	45.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	40.3	94.6
Thanet	2652	9.4	48.2	----	49.6	29.2	44.0	35.6	42.1	56.7	44.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	39.9	90.5
English Malting	2654	7.8	40.8	----	48.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	32.3	82.8
Golden Melon	411	7.3	47.7	----	36.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	30.3	77.7
Swedish	2655	7.1	49.6	----	57.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	38.0	97.4
New Zealand	2656	6.3	40.2	----	52.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	33.1	84.9
Baku	333	5.0	----	50.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	27.7	88.5
Petschora	2658	4.2	----	----	----	28.1	56.9	33.5	35.8	54.2	53.1	18.3	41.7	43.7	----	----	----	----	----	----	----	----	----	----	----	----	----	10	36.9	98.7
Mensury	2657	2.7	----	----	41.0	33.7	69.0	59.4	34.4	55.8	58.3	40.8	48.3	42.1	71.7	47.1	75.4	61.3	61.3	59.8	72.9	44.6	76.4	79.2	81.9	54.2	78.9	24	56.3	122.7
Polar	2653	1.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	1.0	13.3
Prize Prolific	169	----	48.8	75.7	52.9	27.1	42.3	36.7	34.8	46.3	56.5	23.7	24.2	20.4	----	----	----	----	----	----	----	----	----	----	----	----	----	12	40.8	101.5
Goldthorpe	327	----	56.5	65.4	67.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	63.1	123.7
Saale	2645	----	40.3	----	54.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	47.1	97.7
Odessa	182	----	68.5	66.3	45.0	33.1	60.2	32.5	40.6	53.7	52.3	42.7	26.7	29.2	66.3	57.5	68.3	60.8	71.3	61.3	64.6	50.2	64.1	80.8	60.1	46.7	61.7	25	54.6	116.4
Rennie Improved	181	----	54.5	56.8	51.9	31.8	51.7	39.4	42.7	59.2	54.0	26.0	32.1	36.3	54.0	43.3	66.7	----	----	----	----	----	----	----	----	----	----	15	46.7	109.4
Baxter	185	----	44.0	----	32.5	30.2	57.9	36.5	32.7	63.7	53.5	21.3	37.5	14.6	41.3	53.3	----	----	----	----	----	----	----	----	----	----	----	13	39.9	97.1
Kulu	2694	----	50.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	50.0	102.9
Palampur	2691	----	60.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	60.6	124.7
Seoraj	2693	----	47.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	47.0	96.7
Spiti Valley	2664	----	39.4	----	27.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	33.7	69.9
Bhagarmany Hills	2698	----	39.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	39.3	80.9
California Prolific	2649	----	----	69.0	39.0	30.8	57.3	24.0	36.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	42.8	102.1
Kinver Chevalier	587	----	----	61.4	45.0	19.0	45.6	32.9	21.3	49.6	56.3	24.4	17.5	29.6	----	----	----	----	----	----	----	----	----	----	----	----	----	11	36.6	92.0
Italian	342	----	----	----	60.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	60.8	127.2
Sharpe Chevalier	2650	----	----	----	56.7	30.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	43.5	118.5
Phoenix Von Thalen	325	----	----	----	54.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	54.2	113.4
Bestehorn	331	----	----	----	52.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	52.5	109.8
Peacock	2666	----	----	----	48.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	48.3	101.0
Kangra Valley	2689	----	----	----	43.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	43.4	90.8
Fan	341	----	----	----	42.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	42.3	88.5
Selected Chevalier	2662	----	----	----	38.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	38.5	80.5
Excelsior	2684	----	----	----	----	36.7	47.9	44.0	49.2	46.3	46.7	27.5	40.8	15.8	----	----	----	----	----	----	----	----	----	----	----	----	----	9	39.4	102.3
Common	184	----	----	----	----	33.1	63.1	55.0	43.5	62.9	55.8	29.8	29.2	31.0	61.7	42.9	60.0	49.2	----	----	----	----	----	----	----	----	----	13	47.5	111.8
Champion	2683	----	----	----	----	30.8	48.1	52.1	47.7	37.5	47.5	29.4	30.8	12.5	32.5	21.7	42.9	54.0	35.0	32.5	----	----	----	----	----	----	----	15	37.0	84.5

TABLE 7.—*Annual acre yields of varieties of barley grown at the experimental farm for Manitoba (at Brandon) in one or more of the 27 years from 1889 to 1915, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																										Years grown	Average yield (bus.)	Percentage of weighted mean
		1889	1890	1891	1892	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915			
Oderbrucker	2700	----	----	----	----	27.5	49.0	34.6	34.6	62.1	55.8	40.4	29.6	17.9	63.3	41.7	65.8	47.9	81.3	45.4	62.1	42.7	----	----	----	----	----	17	47.1	105.6
Trooper	173	----	----	----	----	26.7	65.2	40.8	51.3	62.9	65.8	26.9	29.2	17.1	53.3	53.3	53.3	55.2	50.6	49.4	64.2	41.9	62.9	----	----	----	----	18	48.3	107.3
Success	2707	----	----	----	----	25.0	30.2	35.6	44.8	44.2	41.7	31.5	29.6	18.3	----	----	----	----	----	----	----	----	----	65.8	46.8	41.1	69.8	13	40.3	96.2
Summit	174	----	----	----	----	22.3	59.0	29.8	50.2	57.5	66.3	24.6	37.5	22.1	67.3	52.9	64.6	50.2	71.3	----	----	----	----	----	----	----	----	14	48.3	110.8
Royal	1252	----	----	----	----	21.3	65.6	41.9	25.4	55.4	61.9	16.5	33.7	9.6	50.8	46.3	50.0	50.4	----	----	----	----	----	----	----	----	----	13	40.7	95.8
Surprise	171	----	----	----	----	17.3	65.2	38.7	39.0	58.3	58.5	31.3	32.1	15.0	----	----	----	----	----	----	----	----	----	----	----	----	----	9	39.5	102.6
Beaver	1915	----	----	----	----	32.1	50.2	29.6	34.2	57.9	52.5	24.0	18.7	21.3	32.1	52.5	54.6	48.5	45.0	41.5	60.4	43.1	43.5	62.5	48.6	31.1	47.9	22	42.3	90.8
French Chevalier	175	----	----	----	----	31.5	62.3	41.0	43.5	57.9	60.8	29.0	23.7	26.3	27.7	42.9	62.1	61.0	67.9	42.5	50.0	41.5	----	----	----	----	----	17	45.4	101.8
Golden Grain	588	----	----	----	----	25.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	25.6	93.8
Canadian Thorpe	740	----	----	----	----	24.8	58.3	32.7	23.3	45.4	49.8	34.4	27.3	7.5	24.6	55.4	56.7	51.0	71.9	41.9	65.4	61.3	65.5	62.3	66.8	43.4	66.1	22	47.1	101.1
Newton	172	----	----	----	----	19.2	56.0	47.9	22.1	53.7	61.0	22.8	19.6	14.2	33.3	30.4	53.3	----	----	----	----	----	----	----	----	----	----	12	36.1	86.6
Pioneer	2677	----	----	----	----	33.1	----	----	29.2	63.3	56.9	40.4	27.5	23.1	----	----	----	----	----	----	----	----	----	----	----	----	----	7	39.1	105.7
Bolton	177	----	----	----	----	30.2	----	43.3	37.1	45.8	62.1	21.0	26.3	29.2	----	----	----	----	----	----	----	----	----	----	----	----	----	8	36.9	99.5
Sidney	178	----	----	----	----	24.4	60.2	37.7	46.7	47.5	53.1	24.0	25.8	14.2	39.4	55.8	48.3	49.8	64.8	41.3	----	----	----	----	----	----	----	15	42.2	96.3
Victor	179	----	----	----	----	20.2	----	32.5	42.1	46.7	59.6	27.7	27.9	32.1	----	----	----	----	----	----	----	----	----	----	----	----	----	8	36.1	97.3
Stella	2678	----	----	----	----	18.5	53.7	42.3	33.5	68.3	56.9	34.0	21.7	26.3	54.0	53.3	63.7	49.0	63.3	48.7	67.9	----	23.3	----	----	----	----	17	45.8	102.2
Nugent	176	----	----	----	----	----	68.5	45.4	41.0	51.7	61.5	37.2	33.7	20.8	73.1	47.5	60.4	65.8	54.2	47.1	61.3	41.9	59.0	----	----	----	----	17	51.2	111.5
Vanguard	2665	----	----	----	----	----	64.2	40.6	29.4	46.7	58.7	25.8	39.6	15.6	----	----	----	----	----	----	----	----	----	----	----	----	----	8	40.1	101.3
Phoenix	2676	----	----	----	----	28.3	51.7	42.3	39.4	55.4	53.5	25.8	44.2	24.6	----	----	----	----	----	----	----	----	----	----	----	----	----	9	40.6	105.5
Emerson	2739	----	----	----	----	----	61.7	36.7	40.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	46.3	108.4
Monck	2703	----	----	----	----	----	----	33.1	21.5	45.4	46.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	36.5	77.5
Rigid	2682	----	----	----	----	----	----	33.1	32.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	32.8	87.5
Pacer	2667	----	----	----	----	----	----	30.4	46.3	45.8	47.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	42.5	90.2
Nepean	183	----	----	----	----	----	----	30.2	46.0	55.4	58.3	26.7	31.7	34.6	----	----	----	----	----	----	----	----	----	----	----	----	----	7	40.4	106.0
Blue Long Head	2685	----	----	----	----	----	----	----	27.7	35.4	46.7	33.3	33.3	13.1	----	----	62.9	66.9	67.9	57.9	----	----	----	----	----	----	----	10	44.5	102.1
Argyle	2681	----	----	----	----	----	----	----	----	62.5	63.7	15.2	43.7	24.2	55.8	54.6	67.1	51.5	63.5	----	----	----	----	----	----	----	----	10	50.2	111.3
Mansfield	2241	----	----	----	----	----	----	----	----	60.8	64.5	35.6	47.5	17.1	66.3	52.5	77.5	47.9	67.5	56.9	71.3	46.9	53.4	73.3	54.6	46.9	----	17	55.3	115.2
Empire	2680	----	----	----	----	----	----	----	----	55.4	57.9	33.3	33.3	25.8	61.7	58.7	55.8	56.5	70.4	52.5	----	----	----	----	----	----	----	11	51.0	112.6
Kirby	2671	----	----	----	----	----	----	----	----	65.4	55.4	----	28.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	49.7	105.7
Dunham	2670	----	----	----	----	----	----	----	----	62.5	63.7	17.9	41.7	27.9	40.6	56.7	53.7	49.8	59.6	----	----	----	----	----	----	----	----	10	47.4	105.1
Leslie	2669	----	----	----	----	----	----	----	----	57.1	55.0	20.0	35.4	28.7	----	----	----	----	----	----	----	----	----	----	----	----	----	5	39.2	102.3
Logan	2668	----	----	----	----	----	----	----	----	54.2	68.1	19.8	35.4	26.3	37.7	52.5	52.9	47.7	59.2	----	----	----	----	----	----	----	----	10	45.4	100.7
Harvey	2675	----	----	----	----	----	----	----	----	----	64.6	17.0	42.5	37.9	35.0	55.8	63.3	53.5	----	----	----	----	----	----	----	----	----	8	46.2	108.7
Fulton	2706	----	----	----	----	----	----	----	----	----	62.1	16.9	36.3	21.3	33.7	59.6	----	----	----	----	----	----	----	----	----	----	----	6	38.3	98.5
Clifford	1910	----	----	----	----	----	----	----	----	----	56.7	19.2	39.2	23.7	31.9	58.7	54.2	60.6	54.2	36.9	54.5	48.7	50.2	65.8	59.8	----	----	15	47.6	100.0
Jarvis	2672	----	----	----	----	----	----	----	----	----	55.8	22.6	47.9	19.2	30.6	55.8	63.7	66.5	72.1	35.8	63.3	50.4	49.4	----	----	----	----	13	48.7	105.9
Claude	1557	----	----	----	----	----	----	----	----	----	67.1	36.3	38.7	19.4	55.4	55.8	58.3	57.5	75.4	52.3	57.9	39.2	62.2	----	----	----	----	13	52.0	113.0
Yale	1592	----	----	----	----	----	----	----	----	----	53.3	36.3	47.1	13.3	70.0	62.5	63.7	60.2	65.4	56.4	68.3	54.6	63.3	71.7	55.4	----	----	15	56.1	117.9
Garfield	2673	----	----	----	----	----	----	----	----	----	51.7	32.7	46.3	30.4	55.4	52.5	----	----	----	----	----	----	----	----	----	----	----	6	44.8	115.2

Bromo	2679	----	----	----	----	----	----	----	----	----	48.3	31.5	27.9	20.4	66.7	66.7	62.1	44.6	----	----	----	----	----	----	----	----	----	8	46.0	108.2
Albert	1551	----	----	----	----	----	----	----	----	----	48.3	20.8	44.2	20.4	58.7	46.3	66.3	55.8	59.6	56.9	65.8	39.4	58.8	----	----	----	----	13	49.3	107.2
Black Hull-less	596	----	----	----	----	----	----	----	----	----	44.2	15.8	36.7	32.7	----	----	----	----	----	----	----	----	----	----	----	----	----	4	32.3	92.0
Nepal	595	----	----	----	----	----	----	----	----	----	34.2	17.7	16.3	35.6	----	----	----	----	----	----	----	----	----	----	----	----	----	4	25.9	73.8
Gordon	2674	----	----	----	----	----	----	----	----	----	----	21.7	43.7	27.5	30.0	63.7	67.9	59.4	48.1	41.7	59.2	----	----	----	----	----	----	10	46.3	105.7
Standwell	581	----	----	----	----	----	----	----	----	----	----	----	30.4	36.5	31.9	63.7	59.6	47.3	79.2	49.6	59.0	52.7	64.0	----	----	----	----	11	52.2	110.6
Invincible	590	----	----	----	----	----	----	----	----	----	----	----	29.2	27.3	32.5	63.7	53.7	50.2	52.7	36.3	44.0	50.6	----	----	----	----	----	10	44.0	94.4
Chevalier II	209	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	53.7	55.8	78.7	54.2	47.1	60.2	54.8	56.7	67.9	43.6	67.5	10	58.2	99.3
O. A. C. 21	1470	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	56.0	73.7	50.2	74.1	87.5	68.5	51.7	58.5	8	65.0	111.7
Hannchen	531	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	64.7	63.5	73.3	80.5	----	----	4	70.5	115.6
Manchurian	739	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	76.5	80.8	70.6	56.7	77.4	5	72.4	114.9
Himalaya	1934	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	67.5	54.6	48.1	72.5	4	60.7	94.7
Silver King	890	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	74.2	72.5	----	----	2	73.3	106.4
Garton 68	2740	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	86.7	79.8	55.4	83.9	4	76.5	119.3
Brewers Favorite	586	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	73.3	66.5	34.3	----	3	58.0	92.3
Gold	1145	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	65.0	80.9	55.2	84.8	4	71.5	111.5

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			French Chevalier	Canadian Thorpe	Hannchen	Mensury	Odessa	Blue Long Head	Nepal	Himalaya	Yale	Excelsior
French Chevalier	175	Years comparable	----	17	1	17	17	10	4	(*)	12	9
		Percentage yield	----	105.5	64.1	82.4	88.6	106.7	134.7		82.2	105.9
Canadian Thorpe	740	Years comparable	17	----	4	22	22	10	4	4	15	9
		Percentage yield	94.8	----	90.7	79.3	87.4	91.9	114.6	98.3	88.2	85.5
Hannchen	531	Years comparable	1	4	----	4	4	(*)	(*)	2	4	(*)
		Percentage yield	155.9	110.2	----	100.0	110.5			126.0	115.1	
Mensury	2657	Years comparable	17	22	4	----	23	10	4	4	15	9
		Percentage yield	121.3	126.1	100.0	----	109.6	120.8	182.6	121.2	109.5	124.5
Odessa	182	Years comparable	17	22	4	23	----	10	4	4	15	9
		Percentage yield	112.9	114.4	90.5	91.3	----	113.9	145.4	102.7	101.7	104.5
Blue Long Head	2685	Years comparable	10	10	(*)	10	10	----	4	(*)	8	6
		Percentage yield	93.8	108.8		82.8	87.8	----	121.8		96.5	83.7
Nepal	595	Years comparable	4	4	(*)	4	4	4	----	(*)	4	4
		Percentage yield	74.2	87.2		54.8	68.8	82.1	----		69.2	79.4
Himalaya	1934	Years comparable	(*)	4	2	4	4	(*)	(*)	----	2	(*)
		Percentage yield		101.7	79.4	82.5	97.4			----	96.1	
Yale	1592	Years comparable	12	15	4	15	15	8	4	2	----	4
		Percentage yield	121.6	113.4	86.9	91.4	98.3	103.6	144.5	104.1	----	114.7
Excelsior	2684	Years comparable	9	9	(*)	9	9	6	4	(*)	4	----
		Percentage yield	94.4	116.9		80.3	95.7	119.4	126.0		87.2	----

INDIAN HEAD, SASKATCHEWAN

The experimental farm at Indian Head, Saskatchewan, was also one of the earlier ones to be established in Canada. Field tests of barley were begun in 1888, and by 1915 some varieties had been tested for as many as 25 years. The results are given in Table 8. The Manchuria barleys yielded well at Indian Head, but they were not relatively so good as at Brandon. While the Chevalier group did not rank high, the yield of Danish Chevalier (C. I. No. 182) was 109 per cent of the weighted mean over a period of 25 years. From the digest made of the various groups the Manchuria is shown to be distinctly superior to all the others. The Thorpe and Hanna groups were better than the Chevalier at Indian Head. The Polar varieties were promising, but the hybrid sorts did not average high in yield. Ten varieties of different types are compared in the summarized digest of Table 8. Blue Long Head (C. I. No. 2685), a barley of North African origin, was the best of these by a small margin. This is of interest because it is a definite indication of the change of ecological conditions, the more arid summers being suitable to the growing of barleys of the North African type. It appears that Indian Head is on the border line of an ecological area as far as the production of barley is concerned. Hannchen (C. I. No. 531), Odessa (C. I. No. 182), Danish Chevalier (C. I. No. 180), and Mensury (C. I. No. 2657) gave yields in the order named. A number of varieties given in Table 8 were not in the test a sufficient number of years to establish their value. The most promising of these were Hannchen (C. I. No. 531), O. A. C. 21 (C. I. No. 1470), Gold (C. I. No. 1145), Standwell (C. I. No. 584), and Invincible (C. I. No. 590). These last two are hybrid varieties of the Thorpe type.

TABLE 8.—*Annual acre yields of varieties of barley grown at the experimental farm for southern Saskatchewan (at Indian Head) in one or more of the 28 years from 1888 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C.I. No.	Acre yields (bushels)																												Years grown	Average yield (bus.)	Percentage of weighted mean
		1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915			
Golden Melon	411	34.0	17.7	50.6	42.2	48.7			45.0																					6	39.7	104.2
Peerless White	2647	33.3	18.8	40.3																										3	30.8	96.0
Chevalier	2651	24.0	26.7	43.3																										3	31.3	97.5
Thanet	2652	56.7	21.2	49.1	49.0	43.7	51.5	18.7	54.8	50.6	45.2	54.4	57.1																	12	46.0	102.9
Polar	2653	33.0																												1	33.0	91.2
Danish Chevalier	180		12.7	46.2	44.4		54.6	21.9	54.4	61.5	52.1	57.9	66.7		57.1	53.7	66.0	59.2	55.4	60.0	58.3	60.0	41.7	70.4	82.9	83.3	71.7	63.3	75.8	25	57.2	108.7
English Malting	2654		23.4	37.5		39.7																								3	33.5	100.9
Swedish	2655		24.6	53.2																										2	38.9	122.7
Prentice	917		13.9	37.2	40.0																									3	30.4	89.1
New Zealand	2656		23.1	36.7	37.4	33.3																								4	32.6	93.7
Mensury	2657		12.4	47.4	43.0	36.3	36.3	19.7	43.7	71.9	66.9	47.3	62.1	54.2	67.1	51.3	63.7	53.5	69.8	57.5	61.3	45.4	54.2	66.3	80.8					23	52.7	105.4
Petschora	2658		7.8				37.3	16.9	31.6	58.3	70.0	54.8	60.0	42.1	59.2	42.1														11	43.6	93.4
Prince Edward	2660		13.4																											1	13.4	74.9
Beardless	2646		27.3	45.0		40.6																								3	37.6	113.3
Saale	2645		19.6	53.6																										2	36.6	115.5
Early Minting	2661		13.7	34.0																										2	23.9	75.4
Selected Chevalier	2662		12.0	25.0	50.7	35.4																								4	30.8	88.5
Peerless	2663		16.3	39.2	36.4	38.7																								4	32.7	94.0
Prize Prolific	169			49.1	45.0	48.4	44.0	17.7	59.0	52.1	50.0	53.7	56.7		56.7	47.5														12	48.3	101.5
Duckbill	1916			55.4	60.0	31.1	50.4	11.7	45.0	60.4																				7	44.9	108.2
Goldthorpe	327			45.5			48.9	14.4	45.0																					4	38.5	105.2
Sharpe Chevalier	2650			46.9	47.2	49.2	42.1	15.6	45.2																					6	41.0	110.2
Baxter	185			41.3		33.3	36.9	15.6	40.4	65.0	66.7	52.3	63.7		50.0	40.4	50.4	59.3												13	47.3	95.6
Odessa	182			38.1			49.7	23.7	54.6	62.5	68.1	53.1	61.3	55.0	68.7	65.0	71.3	62.5	62.1	65.8	41.6	42.9	52.5	69.6	85.4					20	57.7	112.3
Rennie Improved	181			39.3	46.7	41.7	49.4	18.7	62.3	55.4	68.1	56.7	69.6	46.3	52.5	46.7	57.3	62.2	63.3											16	52.3	106.1
Sialkot	2695			20.0																										1	20.0	50.9
Scoraj	2693			25.5																										1	25.5	64.9
Kulu	2694			38.2																										1	38.2	97.2
Simla	2692			24.0																										1	24.0	61.1
Palampur	2691			30.6																										1	30.6	77.9
Bhagarmany Hills	2698			31.9																										1	31.9	81.2
Lahoul	2690			28.0																										1	28.0	71.2
Spiti Valley	2664			37.2	24.7	20.4																								3	27.4	69.5
Baku	333			28.0	26.7	22.9																								3	25.9	65.7
Kinver Chevalier	587					41.7	54.7	19.4	56.5	42.5	51.0	53.1	55.0		55.8	51.7														10	48.1	99.2
California Prolific	2649					30.8	50.3	15.6	48.0	64.0																				5	41.7	99.5
Golden Grain	588					35.6																								1	35.6	95.4
Newton	172						39.3	15.6	48.1	68.7	51.0	53.3	43.3		55.4	47.5	61.0	40.0	57.1											12	48.4	93.8

TABLE 8.—*Annual acre yields of varieties of barley grown at the experimental farm for southern Saskatchewan (at Indian Head) in one or more of the 28 years from 1888 to 1915, inclusive*—Continued

Variety	C.I. No.	Acre yields (bushels)																												Years grown	Average yield (bus.)	Percentage of weighted mean
		1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915			
Common	184	----	----	----	----	----	36.9	16.3	41.4	68.7	71.3	49.0	58.3	50.8	53.7	50.0	60.4	64.6	65.4	60.8	----	----	----	----	----	----	----	----	----	14	53.4	105.5
Himalaya	1934	----	----	----	----	----	41.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	41.0	91.9
Canadian Thorpe	740	----	----	----	----	----	43.7	12.5	50.1	65.0	53.1	50.2	58.7	15.0	50.8	49.2	71.0	55.8	55.0	48.3	51.7	40.0	45.8	51.7	75.0	87.5	68.3	52.6	69.2	23	53.1	99.3
Surprise	171	----	----	----	----	----	39.0	12.5	38.5	52.3	55.6	37.5	56.3	38.7	46.3	53.7	----	----	----	----	----	----	----	----	----	----	----	----	----	10	43.0	89.6
Summit	174	----	----	----	----	----	40.7	15.6	40.6	59.4	55.6	46.0	62.5	36.7	56.3	60.8	61.0	61.9	62.9	48.7	42.9	----	----	----	----	----	----	----	----	15	50.1	98.4
Oderbrucker	2700	----	----	----	----	----	----	22.9	40.0	65.2	71.0	44.7	58.7	----	53.3	49.2	54.8	57.4	62.5	55.0	68.5	40.8	61.0	60.4	77.9	72.5	74.2	59.9	83.3	21	58.7	107.5
Rigid	2682	----	----	----	----	----	----	20.0	48.3	60.4	50.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	44.7	97.6
Royal	1252	----	----	----	----	----	----	19.2	41.9	61.8	63.7	45.6	60.0	41.7	63.3	58.7	60.0	58.7	60.8	50.8	----	----	----	----	----	----	----	----	----	13	52.8	103.9
Phoenix	2676	----	----	----	----	----	----	17.7	----	58.0	51.3	50.4	60.4	24.6	40.0	40.0	----	----	----	----	----	----	----	----	----	----	----	----	----	8	42.8	88.4
Trooper	173	----	----	----	----	----	----	16.9	45.8	67.3	57.9	51.5	69.2	40.0	59.6	48.3	64.2	57.0	62.5	53.7	58.9	59.2	49.2	67.1	78.3	72.5	80.8	----	----	20	58.0	108.6
Beaver	1915	----	----	----	----	----	----	16.7	52.1	66.7	52.5	37.1	55.4	----	36.7	51.7	56.3	50.9	75.0	40.4	48.3	37.9	32.9	48.7	----	----	----	----	----	16	47.5	91.2
Bolton	177	----	----	----	----	----	----	15.0	46.2	55.8	47.3	41.3	58.3	----	59.6	45.8	----	----	----	----	----	----	----	----	----	----	----	----	----	8	48.2	97.8
Victor	179	----	----	----	----	----	----	12.5	----	60.8	45.6	37.5	53.3	----	47.1	43.7	----	----	----	----	----	----	----	----	----	----	----	----	----	7	42.9	86.3
Sidney	178	----	----	----	----	----	----	12.5	42.9	61.9	44.8	50.0	63.7	34.2	61.7	59.1	62.5	49.0	51.3	54.0	50.6	46.3	----	----	----	----	----	----	----	15	49.6	97.0
Pioneer	2677	----	----	----	----	----	----	6.7	38.2	----	49.7	47.5	56.3	36.3	54.2	44.2	----	----	----	----	----	----	----	----	----	----	----	----	----	8	41.6	88.7
Success	2707	----	----	----	----	----	----	----	45.0	50.0	51.7	42.1	50.0	----	41.3	37.5	----	----	----	----	----	----	----	----	----	----	56.9	22.6	44.2	10	44.1	81.3
Nugent	176	----	----	----	----	----	----	----	42.7	55.4	56.3	47.5	55.0	27.5	55.8	53.7	54.6	67.5	78.7	49.6	55.6	37.1	55.2	62.9	90.8	----	----	----	----	17	55.6	103.2
Stella	2678	----	----	----	----	----	----	----	41.7	55.6	58.3	47.3	61.3	33.7	51.3	48.7	54.1	65.4	82.9	47.9	52.1	55.8	45.0	68.3	85.8	90.0	80.0	57.1	83.3	21	60.3	108.8
Excelsior	2684	----	----	----	----	----	----	----	41.7	54.4	57.7	46.3	55.0	----	35.0	38.3	----	----	----	----	----	----	----	----	----	----	----	----	----	7	46.9	89.5
Vanguard	2665	----	----	----	----	----	----	----	37.5	55.2	66.7	30.4	55.0	33.3	45.8	40.4	----	----	----	----	----	----	----	----	----	----	----	----	----	8	45.4	89.2
Champion	2683	----	----	----	----	----	----	----	37.5	53.3	54.4	46.3	46.3	----	47.1	36.7	45.4	41.1	36.3	41.7	47.5	35.8	----	----	----	----	----	----	----	13	43.8	81.3
Monck	2703	----	----	----	----	----	----	----	----	57.9	37.5	36.5	48.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	45.1	82.8
French Chevalier	175	----	----	----	----	----	----	----	54.8	73.3	53.3	53.1	65.8	----	57.9	43.3	71.5	58.3	50.4	41.3	36.3	48.3	33.3	62.5	----	----	----	----	----	15	53.6	99.3
Nepean	183	----	----	----	----	----	----	----	----	57.5	47.7	41.7	50.0	28.3	58.3	37.9	----	----	----	----	----	----	----	----	----	----	----	----	----	7	45.9	89.1
Pacer	2667	----	----	----	----	----	----	----	----	46.0	43.5	35.6	45.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	42.6	78.2
Blue Long Head	2685	----	----	----	----	----	----	----	----	----	65.8	42.5	65.8	37.1	57.1	62.5	----	----	73.7	64.2	86.0	45.4	----	----	----	----	----	----	----	10	60.0	116.1
Argyle	2681	----	----	----	----	----	----	----	----	----	----	47.9	68.7	----	44.2	45.4	56.7	64.6	62.1	47.9	65.6	----	----	----	----	----	----	----	----	9	55.9	102.9
Mansfield	2241	----	----	----	----	----	----	----	----	----	----	43.3	66.7	----	57.1	57.9	63.1	57.0	70.0	52.9	72.3	38.7	48.7	62.5	91.7	74.6	67.5	39.3	87.5	17	61.8	108.6
Empire	2680	----	----	----	----	----	----	----	----	----	----	37.5	61.3	----	56.7	62.9	56.7	57.1	62.5	55.0	66.5	44.2	----	----	----	----	----	----	----	10	56.0	103.9
Kirby	2671	----	----	----	----	----	----	----	----	----	----	44.6	58.7	27.5	59.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	47.5	95.6
Dunham	2670	----	----	----	----	----	----	----	----	----	----	43.7	57.1	20.4	45.4	42.1	52.3	46.6	41.7	39.2	48.3	----	----	----	----	----	----	----	----	10	43.7	82.6
Leslie	2669	----	----	----	----	----	----	----	----	----	----	40.0	55.8	----	58.7	48.7	----	----	----	----	----	----	----	----	----	----	----	----	----	4	50.8	98.3
Logan	2668	----	----	----	----	----	----	----	----	----	----	39.6	49.2	----	54.6	42.5	62.3	47.6	47.9	46.3	56.3	----	----	----	----	----	----	----	----	9	49.6	91.3
Claude	1557	----	----	----	----	----	----	----	----	----	----	----	69.2	----	66.3	66.7	65.8	66.7	74.2	46.3	65.6	41.7	52.5	62.5	81.7	----	----	----	----	12	63.3	112.8
Yale	1592	----	----	----	----	----	----	----	----	----	----	----	58.7	----	48.7	48.3	53.9	64.2	73.3	52.1	67.1	45.8	46.3	65.4	79.6	----	----	----	----	12	58.6	104.5
Brome	2679	----	----	----	----	----	----	----	----	----	----	----	57.5	30.8	58.3	49.6	63.5	60.8	61.3	44.6	----	----	----	----	----	----	----	----	----	8	53.3	99.6
Garfield	2673	----	----	----	----	----	----	----	----	----	----	----	55.8	25.4	53.3	52.1	55.6	53.8	----	----	----	----	----	----	----	----	----	----	----	6	49.3	93.4
Albert	1551	----	----	----	----	----	----	----	----	----	----	----	50.8	----	45.8	42.1	53.5	53.7	57.5	42.5	51.3	45.4	47.1	55.4	----	----	----	----	----	11	49.6	90.3
Black Hull-less	596	----	----	----	----	----	----	----	----	----	----	----	44.8	----	45.8	47.5	----	----	----	----	----	----	----	----	----	----	----	----	----	3	46.0	86.5
Nepal	595	----	----	----	----	----	----	----	----	----	----	----	40.4	31.7	37.1	35.0	----	----	----	----	----	----	----	----	----	----	----	----	----	4	36.1	71.8

Jarvis	2672	----	----	----	----	----	----	----	----	----	----	----	51.3	15.0	57.1	52.5	61.5	46.6	50.0	52.9	61.0	47.1	48.7	54.2	61.7	----	----	----	----	13	50.7	92.7
Fulton	2706	----	----	----	----	----	----	----	----	----	----	----	50.0	20.0	50.8	42.9	59.0	50.9	----	----	----	----	----	----	----	----	----	----	----	6	45.6	86.4
Clifford	1910	----	----	----	----	----	----	----	----	----	----	----	49.6	20.8	54.2	55.0	57.3	49.0	51.7	52.5	53.7	54.5	45.8	58.7	69.6	73.3	67.5	----	----	15	54.2	96.4
Harvey	2675	----	----	----	----	----	----	----	----	----	----	----	49.6	----	57.5	48.7	58.3	49.5	47.5	46.7	----	----	----	----	----	----	----	----	----	7	51.1	92.4
Standwell	584	----	----	----	----	----	----	----	----	----	----	----	----	----	67.9	55.5	80.8	67.2	62.1	52.5	59.2	54.2	40.5	59.2	73.7	93.3	55.8	46.8	62.5	15	62.1	107.3
Invincible	590	----	----	----	----	----	----	----	----	----	----	----	----	----	55.8	57.9	77.3	67.1	74.6	52.5	54.6	41.7	45.4	65.8	74.2	94.2	56.7	52.3	59.2	15	61.9	106.9
Gordon	2674	----	----	----	----	----	----	----	----	----	----	----	----	----	52.5	45.8	64.6	49.5	64.6	52.5	54.6	56.3	52.3	----	----	----	----	----	----	9	54.7	101.3
Primus	532	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	62.5	----	----	----	----	----	----	----	----	----	----	----	1	62.5	109.6
Princess	529	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	60.4	----	----	----	----	----	----	----	----	----	----	----	1	60.4	106.0
Hannchen	531	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	60.4	----	----	----	----	----	77.1	85.8	100.0	78.3	----	----	5	80.3	118.4
Chevalier II	200	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	63.3	59.6	47.5	54.6	59.2	40.6	62.5	70.0	78.3	76.7	57.8	65.0	12	61.3	102.0
Black Japan	2717	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	72.1	48.7	----	----	----	----	----	----	2	60.4	127.2
O. A. C. 21	1470	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	69.6	87.5	93.3	93.3	66.4	89.2	6	83.2	117.3
Manchurian	739	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	68.3	91.3	85.0	73.3	46.8	89.6	6	75.7	106.8
Early Chevalier	2725	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	70.0	76.7	45.8	70.8	4	65.8	92.9
Gold	1145	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	79.2	54.2	94.2	3	75.9	114.0

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			Danish Chevalier	Canadian Thorpe	Hannchen	Mensury	Odessa	Blue Long Head	Nepal	Baku	Stella	Success
Danish Chevalier	180	Years comparable	----	22	5	21	19	9	3	2	20	10
		Percentage yield	----	110.2	91.5	101.4	98.3	92.6	157.8	165.6	101.6	139.2
Canadian Thorpe	740	Years comparable	22	----	5	19	19	10	4	(*)	21	10
		Percentage yield	90.8	----	84.2	87.8	84.5	78.7	120.5	----	92.0	128.5
Hannchen	531	Years comparable	5	5	----	3	3	(*)	(*)	(*)	5	1
		Percentage yield	109.3	118.7	----	111.3	102.7	----	----	----	103.1	137.6
Mensury	2657	Years comparable	21	19	3	----	20	10	4	3	17	7
		Percentage yield	98.6	113.8	89.8	----	97.1	97.1	162.8	163.3	106.5	129.2
Odessa	182	Years comparable	19	19	3	20	----	10	4	1	17	7
		Percentage yield	101.7	118.3	97.4	103.0	----	97.3	173.4	136.1	109.1	136.4
Blue Long Head	2685	Years comparable	9	10	(*)	10	10	----	4	(*)	10	5
		Percentage yield	108.0	127.1	----	103.0	102.8	----	154.3	----	111.3	131.9
Nepal	595	Years comparable	3	4	(*)	4	4	4	----	(*)	4	3
		Percentage yield	64.3	83.0	----	61.4	57.7	64.8	----	----	73.9	87.3
Baku	333	Years comparable	2	(*)	(*)	3	1	(*)	(*)	----	(*)	(*)
		Percentage yield	60.4	----	----	61.2	73.5	----	----	----	----	----
Stella	2678	Years comparable	20	21	5	17	17	10	4	(*)	----	10
		Percentage yield	98.4	108.7	97.0	93.9	91.7	89.9	135.2	----	----	132.5
Success	2707	Years comparable	10	10	1	7	7	5	3	(*)	10	----
		Percentage yield	71.8	77.8	72.7	77.4	73.3	75.8	114.5	----	75.5	----

ROSTHERN, SASKATCHEWAN

Yields of barley are first reported in 1911. In the years 1911 to 1915 the tests included 15 varieties. The relative value of these varieties is more than usually apparent in Table 9, since 11 of them were tested for the full five years. Those of the Manchuria type gave very good yields. The best of these were O. A. C. 21 (C. I. No. 1470) and Manchurian (C. I. No. 739). Unfortunately, no variety of the Coast type was included in the test. Neither are the results quite comparable with those of the older stations, as many of the varieties tested on them were not grown at Rosthern. In the summarized digest of Table 9 a more direct comparison is made with eight varieties. The best of these again was O. A. C. 21, although Svanhals (C. I. No. 187) was practically as good. Duckbill (C. I. No. 1916), a barley of the Thorpe group, ranked third among the varieties compared. Barleys of this group also yielded well at Indian Head. Stella (C. I. No. 2678) was fourth in the list of eight varieties compared. This is one of the better hybrids produced by Doctor Saunders. Odessa (C. I. No. 182) yielded slightly less than Stella.

TABLE 9.—*Annual acre yields of varieties of barley grown at the experimental station for central Saskatchewan (at Rosthern) in part or all of the five years from 1911 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1911	1912	1913	1914	1915			
Odessa	182	100. 8	44. 2	46. 7	67. 4	62. 5	5	64. 3	103. 5
Manchurian	739	96. 7	55. 8	------	67. 5	74. 6	4	73. 7	115. 2
O. A. C. 21	1470	94. 2	57. 1	73. 3	75. 0	67. 5	5	73. 4	118. 2
Black Japan	2717	93. 3	70. 8	58. 3	67. 5	74. 6	5	72. 9	117. 4
Stella	2678	83. 3	49. 2	50. 8	66. 3	82. 9	5	66. 5	107. 1
Mensury	2657	81. 7	58. 3	------	------	------	2	70. 0	104. 5
Taganrog	2721	81. 7	59. 2	59. 2	67. 1	57. 5	5	64. 9	104. 5
Success	2707	58. 3	49. 2	31. 7	32. 7	43. 7	5	43. 1	69. 4
Early Indian	1576	19. 2	------	11. 7	45. 8	32. 4	4	27. 3	42. 7
Duckbill	1916	85. 0	61. 7	67. 5	66. 9	53. 3	5	66. 9	107. 7
Hannchen	531	81. 7	47. 5	------	------	------	2	64. 6	96. 4
Early Chevalier	2725	79. 2	54. 6	65. 0	54. 6	56. 3	5	61. 9	99. 7
Svanhals	187	78. 3	66. 7	74. 2	77. 1	70. 0	5	73. 3	118. 0
Chevalier II	200	71. 7	55. 8	56. 7	53. 3	72. 9	5	62. 1	100. 0
Beaver	1915	70. 8	38. 3	46. 7	45. 4	40. 8	5	48. 4	77. 9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF EIGHT REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages							
			Chevalier II	Duckbill	Svanhals	Hannchen	O. A. C. 21	Odessa	Stella	Success
Chevalier II	200	Years comparable	-------	5	5	2	5	5	5	5
		Percentage yield	-------	92. 8	84. 7	98. 7	84. 6	96. 5	93. 4	144. 0
Duckbill	1916	Years comparable	5	-------	5	2	5	5	5	5
		Percentage yield	107. 7	-------	91. 3	113. 5	91. 1	104. 0	100. 6	155. 1
Svanhals	187	Years comparable	5	5	-------	2	5	5	5	5
		Percentage yield	118. 0	109. 5	-------	112. 2	99. 8	113. 9	110. 2	169. 9
Hannchen	531	Years comparable	2	2	2	-------	2	2	2	2
		Percentage yield	101. 3	88. 1	89. 1	-------	85. 4	89. 1	97. 5	120. 2
O. A. C. 21	1470	Years comparable	5	5	5	2	-------	5	5	5
		Percentage yield	118. 3	109. 8	100. 2	117. 1	-------	114. 1	110. 4	170. 3
Odessa	182	Years comparable	5	5	5	2	5	-------	5	5
		Percentage yield	103. 6	96. 2	87. 8	112. 2	87. 6	-------	96. 7	149. 2
Stella	2678	Years comparable	5	5	5	2	5	5	-------	5
		Percentage yield	107. 1	99. 4	90. 8	102. 6	90. 6	103. 4	-------	154. 2
Success	2707	Years comparable	5	5	5	2	5	5	5	-------
		Percentage yield	69. 5	64. 5	58. 9	83. 2	58. 7	67. 0	64. 8	-------

SCOTT, SASKATCHEWAN

Yields from field plats of barley grown at Scott, Saskatchewan, in the years 1912, 1913, 1914, and 1915 are reported in Table 10. Five of the nine varieties are compared in detail in the summarized digest. Duckbill was the best of the varieties tested for the full four years. O. A. C. 21 (C. I. No. 1470), while second in point of yield, was distinctly inferior to Duckbill (C. I. No. 1916) for these four years. Black Japan (C. I. No. 2717) was third, and Early Chevalier (C. I. No. 2725) was fourth for productivity. There was very little difference in yield between O. A. C. 21, Black Japan, Early Chevalier, and Manchurian (C. I. No. 739). At Scott, as at the other points in Saskatchewan, barleys of the Thorpe type showed much greater promise than in eastern Canada, while barleys of the Manchuria type still yielded well.

TABLE 10.—*Annual acre yields of varieties of barley grown at the experimental station for northwestern Saskatchewan (at Scott) in part or all of the four years from 1912 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1912	1913	1914	1915			
Manchurian	739	65. 0	25. 8	10. 0	61. 9	4	40. 7	101. 0
O. A. C. 21	1470	64. 4	35. 8	14. 6	65. 2	4	45. 0	111. 7
Black Japan	2717	37. 7	37. 5	20. 8	73. 9	4	42. 5	105. 5
Success	2707	10. 8	16. 3	15. 6	31. 4	4	18. 5	45. 9
Early Indian	1576	2. 1	--------	--------	--------	1	2. 1	4. 3
Duckbill	1916	88. 0	29. 6	25. 8	69. 2	4	53. 1	131. 8
Hannchen	531	75. 3	--------	--------	--------	1	75. 3	152. 4
Early Chevalier	2725	51. 8	37. 1	17. 1	60. 2	4	41. 5	103. 0
Brewers Favorite	586	--------	--------	28. 3	57. 7	2	43. 0	109. 1

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF FIVE REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages				
			Early Chevalier	Duckbill	O. A. C. 21	Black Japan	Success
Early Chevalier	2725	Years comparable	----------	4	4	4	4
		Percentage yield	----------	78. 2	92. 3	97. 8	224. 3
Duckbill	1916	Years comparable	4	----------	4	4	4
		Percentage yield	127. 9	----------	118. 1	125. 1	286. 9
O. A. C. 21	1470	Years comparable	4	4	----------	4	4
		Percentage yield	108. 3	84. 7	----------	105. 9	242. 9
Black Japan	2717	Years comparable	4	4	4	----------	4
		Percentage yield	102. 2	79. 9	94. 4	----------	229. 3
Success	2707	Years comparable	4	4	4	4	----------
		Percentage yield	44. 6	34. 9	41. 2	43. 6	----------

LETHBRIDGE, ALBERTA

A part of the farm at Lethbridge, Alberta, is under irrigation. Barley varieties were grown both on dry land and under irrigation. With the exception of 1911 varietal experiments were conducted on the dry land at Lethbridge from 1908 to 1915, inclusive. During this period 32 varieties were tested for one or more years (Table 11). Of five groups compared at this station the Thorpe was distinctly the best. In order of yield the Hanna, Chevalier, Manchuria, and Hybrid follow the Thorpe. It is unfortunate that more groups were not represented. The only variety of the Coast group tested was Blue Long Head (C. I. No. 2685), and it was grown only for the year 1909. It was the best of the 24 varieties grown that year. It was also unfortunate that Hannchen (C. I. No. 531) was not continued in the experiment after 1912. For the two years in which it was grown, Hannchen was superior to the six other varieties with which it is compared in Table 11. Following Hannchen were Chevalier II (C. I. No. 200), Invincible (C. I. No. 590), and Odessa (C. I. No. 182), in the order named. It is apparent that Lethbridge is in a region better adapted to the cultivation of the 2-rowed barleys than to those of the Manchuria type. The data at this point do not show which are superior, the 2-rowed barleys or those of the Coast type. The hybrid varieties were not, for the most part, as promising as they were at the stations farther east. Gold (C. I. No. 1145), a pedigreed barley of the Hanna type, was grown during the years 1914 and 1915. It showed promise during these years, but was not so good as several other varieties.

TABLE 11.—*Annual acre yields of varieties of barley grown on dry land at the experimental station for southern Alberta (at Lethbridge) in one or more of the eight years from 1908 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1912	1913	1914	1915			
Blue Long Head	2685	------	56.9	------	------	------	------	------	1	56.9	137.8
Claude	1557	41.3	55.4	11.9	28.7	40.0	30.0	79.1	7	40.9	114.6
Empire	2680	------	48.2	------	------	------	------	------	1	48.2	116.7
Mansfield	2241	48.8	42.3	10.0	27.5	35.0	32.5	96.9	7	41.9	117.4
Albert	1551	33.4	39.2	7.5	------	------	------	------	3	26.7	91.1
Odessa	182	41.1	37.9	12.5	34.4	40.0	42.5	96.9	7	43.6	122.1
Mensury	2657	31.9	37.9	10.6	------	------	------	------	3	26.8	91.5
Stella	2678	34.8	37.2	8.1	------	------	------	------	3	26.7	91.1
Nugent	176	33.2	36.4	6.3	------	------	------	------	3	25.3	86.3
Yale	1592	33.0	32.1	8.7	------	------	------	------	3	24.6	84.0
Oderbrucker	2700	33.9	30.6	7.5	------	------	------	------	3	24.0	81.9
Trooper	173	33.7	29.2	9.4	------	------	------	------	3	24.1	82.3
Champion	2683	------	20.4	------	------	------	------	------	1	20.4	49.4
Chevalier II	200	43.7	55.4	11.9	41.3	50.0	25.6	86.6	7	44.9	125.8
Invincible	590	39.8	54.0	10.6	42.5	47.5	27.8	83.4	7	43.7	122.4
Sidney	178	------	51.0	------	------	------	------	------	1	51.0	123.5
Standwell	584	34.9	49.6	9.4	------	------	------	------	3	31.3	106.8
Danish Chevalier	180	27.6	45.2	10.0	------	------	------	------	3	27.6	94.2
French Chevalier	175	28.8	43.7	6.3	------	------	------	------	3	26.3	89.8
Gordon	2674	------	41.6	------	------	------	------	------	1	41.6	100.7
Clifford	1910	31.3	41.6	15.6	30.0	35.0	23.7	70.0	7	35.3	98.9
Canadian Thorpe	740	46.4	40.8	10.6	------	------	------	------	3	32.6	111.3
Jarvis	2672	28.9	35.0	8.7	------	------	------	------	3	24.2	82.6
Beaver	1915	25.6	30.1	9.4	------	------	------	------	3	21.7	74.1
Hannchen	531	------	------	16.3	38.7	------	------	------	2	27.5	153.6
O. A. C. 21	1470	------	------	11.9	28.1	35.0	32.2	92.5	5	39.9	118.0
Cole	2731	------	------	------	30.6	40.0	------	------	2	35.3	101.4
Himalaya	1934	------	------	------	28.1	28.7	24.1	16.4	4	24.3	54.9
Manchurian	739	------	------	------	23.1	32.5	25.0	86.6	4	41.8	94.4
Early Chevalier	2725	------	------	------	23.7	39.4	24.7	67.2	4	38.7	87.4
Gold	1145	------	------	------	------	------	30.3	82.5	2	56.4	105.6
Duckbill	1916	------	------	------	------	------	20.0	85.6	2	52.8	98.9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF SEVEN REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages						
			Chevalier II	Invincible	Hannchen	O. A. C. 21	Odessa	Himalaya	Mansfield
Chevalier II	200	Years comparable	--------	7	2	5	7	4	7
		Percentage yield	--------	102.9	96.7	107.9	103.0	209.1	107.3
Invincible	590	Years comparable	7	--------	2	5	7	4	7
		Percentage yield	97.2	--------	96.5	106.1	100.1	206.8	104.3
Hannchen	531	Years comparable	2	2	--------	2	2	1	2
		Percentage yield	103.4	103.6	--------	137.5	117.3	137.7	146.7
O. A. C. 21	1470	Years comparable	5	5	2	--------	5	4	5
		Percentage yield	92.7	94.3	72.7	--------	88.2	193.0	98.9
Odessa	182	Years comparable	7	7	2	5	--------	4	7
		Percentage yield	97.1	99.9	85.3	113.3	--------	219.7	104.2
Himalaya	1934	Years comparable	4	4	1	4	4	--------	4
		Percentage yield	47.8	48.4	72.6	51.8	45.5	--------	50.7
Mansfield	2241	Years comparable	7	7	2	5	7	4	--------
		Percentage yield	93.2	95.9	68.2	101.1	96.0	197.2	--------

Similar experiments were carried on under irrigation from 1908 to 1915, inclusive. Varieties were grown under irrigation in 1911, for which year no yields were reported on dry land. The yields under irrigation are reported in Table 12. Most of the varieties were in the tests for a very short period, which makes difficult a direct inspection of this table. In the unreported group digest the Chevalier group produced the highest yields, while Thorpe, Manchuria, Hanna, and Hybrid ranked second, third, fourth, and fifth, respectively. Although the Hybrid group as a group was quite poor, it will be seen in the summarized digest of Table 12 that Claude (C. I. No. 1557) was the best variety compared. Chevalier II was almost the equal of Claude and Invincible (C. I. No. 590) somewhat inferior, while O. A. C. 21 (C. I. No. 1470) was nearly equal to Invincible. Gold was grown during the years 1914 and 1915, for which years it was third in point of yield, being inferior to both Claude and Chevalier II.

TABLE 12.—*Annual acre yields of varieties of barley grown on irrigated land at the experimental station for southern Alberta (at Lethbridge) in part or all of the eight years from 1908 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915			
Claude	1557	63. 6	59. 8	42. 5	81. 3	81. 6	93. 7	97. 5	80. 0	8	75. 0	122. 0
Mansfield	2241	58. 7	49. 6	37. 5	61. 3	61. 9	84. 1	62. 5	83. 7	8	62. 4	101. 5
Blue Long Head	2685		45. 2							1	45. 2	108. 1
Yale	1592		45. 2							1	45. 2	108. 1
Odessa	182	61. 4	44. 5	30. 0	65. 0	80. 6	91. 0	66. 9	75. 0	8	64. 3	104. 6
Empire	2680		37. 9							1	37. 9	90. 7
Mensury	2657	53. 6	37. 2	25. 0	51. 3					4	41. 8	87. 6
Nugent	176		36. 5							1	36. 5	87. 3
Oderbrucker	2700		36. 5							1	36. 5	87. 3
Albert	1551		30. 6							1	30. 6	73. 2
Stella	2678		30. 6							1	30. 6	73. 2
Champion	2683		27. 7							1	27. 7	66. 3
Trooper	173		24. 8							1	24. 8	59. 3
Standwell	584	64. 3	70. 0	43. 3	63. 7					4	60. 3	126. 4
Sidney	178		62. 7							1	62. 7	150. 0
Chevalier II	200	68. 9	61. 3	53. 7	70. 0	77. 5	93. 1	90. 6	80. 6	8	74. 5	121. 1
Danish Chevalier	180		45. 2							1	45. 2	108. 1
Canadian Thorpe	740		43. 7							1	43. 7	104. 5
Gordon	2674		42. 3							1	42. 3	101. 2
French Chevalier	175		40. 1							1	40. 1	95. 9
Clifford	1910		36. 5	27. 5	41. 3	55. 4	65. 0	53. 7	67. 5	7	49. 6	80. 7
Invincible	590		35. 2	43. 3	62. 5	69. 4	94. 4	82. 8	91. 3	7	68. 4	111. 2
Jarvis	2672		32. 8							1	32. 8	78. 5
Beaver	1915		28. 4							1	28. 4	67. 9
O. A. C. 21	1470				73. 7	76. 9	88. 7	67. 8	90. 0	5	79. 4	108. 0
Manchurian	739				41. 9	78. 9	73. 9	63. 1	72. 5	5	66. 1	89. 9
Hannchen	531					66. 9				1	66. 9	95. 3
Early Chevalier	2725					52. 8	68. 6	54. 4	80. 0	4	63. 9	83. 9
Cole	2731						100. 6			1	100. 6	120. 2
Himalaya	1934						68. 1	75. 0	66. 9	3	70. 0	89. 7
Gold	1145							87. 2	81. 3	2	84. 3	112. 0
Duckbill	1916							63. 4	73. 7	2	68. 5	91. 0

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF SIX REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages					
			Chevalier II	Invincible	O. A. C. 21	Odessa	Himalaya	Claude
Chevalier II	200	Years comparable		7	5	8	3	8
		Percentage yield		110. 0	103. 7	115. 8	125. 9	99. 3
Invincible	590	Years comparable	7		5	7	3	7
		Percentage yield	90. 9		100. 8	105. 7	127. 9	89. 3
O. A. C. 21	1470	Years comparable	5	5		5	3	5
		Percentage yield	96. 4	99. 2		104. 9	117. 4	91. 5
Odessa	182	Years comparable	8	7	5		3	8
		Percentage yield	86. 3	94. 6	95. 3		110. 9	85. 7
Himalaya	1934	Years comparable	3	3	3	3		3
		Percentage yield	79. 5	78. 2	85. 2	90. 2		77. 4
Claude	1557	Years comparable	8	7	5	8	3	
		Percentage yield	100. 7	112. 0	109. 3	116. 6	129. 1	

TABLE 13.—*Annual acre yields of varieties of barley grown at the experimental station for central Alberta (at Lacombe) in part or all of the nine years from 1907 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)									Years grown	Average yield (bus.)	Percentage of weighted mean
		1907	1908	1909	1910	1911	1912	1913	1914	1915			
Nugent	176	72.5	40.0	18.1	53.7	80.8	------	------	------	------	5	53.0	105.6
Mensury	2657	72.5	47.5	40.0	63.7	------	------	------	------	------	4	55.9	122.3
Oderbrucker	2700	70.0	29.2	20.0	58.1	77.5	------	------	------	------	5	51.0	101.6
Mansfield	2241	68.7	62.5	28.7	63.1	83.3	79.6	68.3	72.9	48.8	9	64.0	125.0
Stella	2678	65.0	43.7	18.1	80.0	76.5	62.5	60.4	59.0	41.7	9	59.3	115.8
Claude	1557	60.0	41.3	33.1	79.1	92.3	------	------	------	------	5	61.2	121.9
Summit	174	57.5	------	------	------	------	------	------	------	------	1	57.5	119.3
Odessa	182	26.9	45.0	27.5	77.5	77.5	75.4	55.0	71.9	50.0	9	56.3	110.0
Blue Long Head	2685	53.7	60.0	------	------	------	------	------	------	------	2	56.9	127.6
Empire	2680	51.3	31.3	------	------	------	------	------	------	------	2	41.3	92.6
Albert	1551	48.7	43.7	19.4	73.1	87.7	------	------	------	------	5	54.5	108.6
Champion	2683	48.7	33.7	------	------	------	------	------	------	------	2	41.2	92.4
Yale	1592	47.5	33.7	19.4	77.5	------	------	------	------	------	4	44.5	97.4
Argyle	2681	47.5	------	------	------	------	------	------	------	------	1	47.5	98.5
Trooper	173	42.5	23.7	16.9	71.3	74.0	------	------	------	------	5	45.7	91.0
Clifford	1910	50.0	27.5	18.7	47.5	55.4	------	------	------	------	5	39.8	79.3
French Chevalier	175	46.3	37.5	23.4	47.2	------	------	------	------	------	4	38.6	84.5
Gordon	2674	45.0	43.7	21.3	------	------	------	------	------	------	3	36.7	94.3
Canadian Thorpe	740	45.0	33.7	28.7	68.7	54.6	------	------	------	------	5	46.1	91.8
Dunham	2670	43.7	------	------	------	------	------	------	------	------	1	43.7	90.7
Logan	2668	42.5	------	------	------	------	------	------	------	------	1	42.5	88.2
Standwell	584	40.0	53.7	32.5	80.9	56.0	------	------	------	------	5	52.6	104.8
Sidney	178	38.3	55.0	18.7	------	------	------	------	------	------	3	37.3	95.9
Invincible	590	37.5	56.9	43.7	75.0	59.8	65.2	61.3	71.5	31.7	9	55.8	109.0
Beaver	1915	36.9	18.7	19.7	44.4	49.2	------	------	------	------	5	33.8	67.3
Danish Chevalier	180	32.5	32.5	18.4	49.4	57.7	------	------	------	------	5	38.1	75.9
Jarvis	2672	31.3	21.3	16.0	45.3	------	------	------	------	------	4	28.5	62.4
Chevalier II	200	28.7	52.5	28.1	85.0	60.8	67.1	64.0	85.8	46.3	9	57.6	112.5
Baku	333	------	------	52.3	67.5	------	------	------	------	------	2	59.9	127.7
O. A. C. 21	1470	------	------	------	77.8	80.8	79.2	58.3	67.3	45.4	6	68.1	112.0
Himalaya	1934	------	------	------	80.0	56.3	50.0	41.0	34.6	31.7	6	48.9	80.4
Hannchen	531	------	------	------	83.7	73.4	76.3	68.7	------	------	4	75.5	116.0
Early Chevalier	2725	------	------	------	------	57.7	56.5	50.4	46.3	11.5	5	44.5	75.9
Manchurian	739	------	------	------	------	88.3	69.2	54.4	69.2	41.3	5	64.5	110.1
Princess	529	------	------	------	------	66.9	------	------	------	------	1	66.9	96.5
Primus	532	------	------	------	------	66.4	------	------	------	------	1	66.4	95.8
Svanhals	187	------	------	------	------	60.0	75.4	67.1	45.4	9.2	5	51.4	87.7
Success	2707	------	------	------	------	------	36.5	26.9	10.0	32.5	4	26.5	49.3
Early Indian	1576	------	------	------	------	------	------	12.1	------	------	1	12.1	22.9
Gold	1145	------	------	------	------	------	------	------	71.3	53.1	2	62.2	129.9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			Chevalier II	Invincible	Svanhals	Hannchen	O. A. C. 21	Odessa	Blue Long Head	Himalaya	Mansfield	Success
Chevalier II	200	Years comparable	------	9	5	4	6	9	2	6	9	4
		Percentage yield	------	103.1	126.0	91.7	100.0	102.3	71.4	139.3	90.0	248.5
Invincible	590	Years comparable	9	------	5	4	6	9	2	6	9	4
		Percentage yield	97.0	------	112.6	86.5	89.2	99.2	83.0	124.1	87.3	216.9
Svanhals	187	Years comparable	5	5	------	3	5	5	(*)	5	5	4
		Percentage yield	79.4	88.8	------	92.7	77.7	78.0	------	120.4	72.9	186.1
Hannchen	531	Years comparable	4	4	3	------	4	4	(*)	4	4	2
		Percentage yield	109.1	115.6	107.9	------	102.0	105.9	------	132.9	102.7	228.7
O. A. C. 21	1470	Years comparable	6	6	5	4	------	6	(*)	6	6	4
		Percentage yield	100.0	112.2	128.7	98.0	------	100.4	------	139.2	98.3	236.3
Odessa	182	Years comparable	9	9	5	4	6	------	2	6	9	4
		Percentage yield	97.8	100.8	128.3	94.5	99.6	------	63.2	138.7	88.0	238.2
Blue Long Head	2685	Years comparable	2	2	(*)	(*)	(*)	2	------	(*)	2	(*)
		Percentage yield	140.0	120.4	------	------	------	158.1	------	------	86.7	------
Himalaya	1934	Years comparable	6	6	5	4	6	6	(*)	------	6	4
		Percentage yield	71.8	80.5	83.1	75.2	71.8	72.1	------	------	70.6	148.5
Mansfield	2241	Years comparable	9	9	5	4	6	9	2	6	------	4
		Percentage yield	111.1	114.6	137.3	97.4	101.8	113.7	115.4	141.7	------	254.6
Success	2707	Years comparable	4	4	4	2	4	4	(*)	4	4	------
		Percentage yield	40.2	46.1	53.7	43.7	42.3	42.0	------	67.3	39.3	------

LACOMBE, ALBERTA

Barleys were grown at Lacombe, Alberta, from 1907 to 1915, inclusive, and the results are given in Table 13. Here, again, the groups are not so well represented as would be desirable. The Coast group is represented by one variety, Blue Long Head (C. I. No. 2685), which was grown in 1907 and 1908. For these years its yield was 128 per cent of the weighted mean of all varieties. It produced second highest yield of all the sorts tested in 1908, the last year it was in the test. It is also unfortunate that Hannchen (C. I. No. 531) was not carried longer. It gave the highest yield of all varieties tested in 1913, the year in which it was discarded. There were only four groups that could be compared. Of these, Manchuria ranked highest. The Thorpe, Hybrid, and Chevalier II followed in the order named.

In the summarized digest of Table 13 10 varieties are compared with each other. Owing to the fact that these varieties were seldom comparable for many years, the results are not very conclusive. The varietal comparison in this case is more indicative of the type values than the group comparison. Hannchen was the best of the varieties compared. Mansfield (C. I. No. 2241), one of the hybrid varieties, was slightly inferior to Hannchen. O. A. C. 21 (C. I. No. 1470) and Chevalier II (C. I. No. 200) were practically equal in yield. Blue Long Head was synchronous with only 4 of the 10 varieties compared. In the two years in which comparisons can be made, it was inferior to Mansfield but superior to Chevalier II, Invincible (C. I. No. 590), and Odessa (C. I. No. 182). Success (C. I. No. 2707) in all but two instances gave a yield of less than half that of other varieties. Barleys of this type have been included in the digest of results from most stations, because they are widely sold by seedsmen and because of the fact that if they possessed high yielding power they would be preferred by farmers. Gold (C. I. No. 1145) was grown during the years 1914 and 1915. It was the highest yielding variety in 1915, but only fifth in yield in 1914.

TABLE 14.—*Annual acre yields of varieties of barley grown at the experimental station at Fort Vermilion, Alberta, in part or all of the four years from 1912 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1912	1913	1914	1915			
Mensury	2657	75. 6	61. 3	55. 0	66. 3	4	64. 5	111. 0
Claude	1557	63. 3	60. 0	57. 5	71. 8	4	63. 1	108. 6
Canadian Thorpe	740	58. 7	48. 7	62. 5	46. 6	4	54. 1	93. 1
Sidney	178	55. 6	30. 4	61. 3	51. 7	4	49. 7	85. 5
Champion	2683		65. 0		67. 2	2	66. 1	116. 0
Success	2707		60. 0	51. 3	60. 5	3	57. 3	100. 5
Nepal	595			53. 7	51. 9	2	52. 8	90. 6

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF FIVE REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages				
			Canadian Thorpe	Mensury	Nepal	Claude	Success
Canadian Thorpe	740	Years comparable		4	2	4	3
		Percentage yield		83. 8	103. 3	85. 7	91. 9
Mensury	2657	Years comparable	4		2	4	3
		Percentage yield	119. 3		114. 1	102. 2	106. 3
Nepal	595	Years comparable	2	2		2	2
		Percentage yield	96. 8	87. 1		81. 7	94. 5
Claude	1557	Years comparable	4	4	2		3
		Percentage yield	116. 7	97. 8	122. 4		110. 2
Success	2707	Years comparable	3	3	2	3	
		Percentage yield	108. 9	94. 1	105. 9	90. 8	

FORT VERMILION, ALBERTA

The yields reported in Table 14 were from barleys grown at Fort Vermilion, Alberta. Seven varieties were tested in the four years from 1912 to 1915, inclusive. In the summarized digest of the table five of these are compared. The best is Mensury (C. I. No. 2657). Claude was second highest in yield, while Success (C. I. No. 2707) was better than Canadian Thorpe (C. I. No. 740). Nepal (C. I. No. 595), as usual, was inferior to Success. The range of varieties in this test is not sufficient to draw any conclusions as to the types best adapted to this region. It does appear, however, that Manchuria does very well in the Fort Vermilion section.

ST. BERNARD MISSION SUBSTATION, GROUARD, ALBERTA

Two varieties of barley, Odessa (C. I. No. 182) and Manchurian (C. I. No. 739), were grown at St. Bernard Mission substation, Grouard, Alberta, in 1913. Their yields were 35.2 bushels and 34 bushels, respectively. Manchurian was grown again in 1914, when it produced 40 bushels to the acre. It would seem that barleys give good yields as far north as Grouard.

BEAVER LODGE, ALBERTA

Three varieties of barley were grown at Beaver Lodge, Alberta, in 1915. Owing to an accident the yield of Success (C. I. No. 2707) was not determined, although it appeared to be the poorest of the three. Manchurian (C. I. No. 739) yielded 42.5 bushels and French Chevalier (C. I. No. 175) 38.7 bushels.

EXPERIMENTS IN THE NORTHWEST TERRITORY

In 1915 barley was grown at three points in the Northwest Territory, but the yields were not reported. At Fort Resolution, in the Mackenzie district, barley and wheat did not mature successfully. They were seeded rather late and did not ripen before frost. At Fort Providence, also in the Mackenzie district, Manchuria and Success were grown. They were seeded on April 23 and ripened about August 1. At Fort Smith the results were considered promising, although the plats were injured by heavy frosts in June.

AGASSIZ, BRITISH COLUMBIA

Barleys were first grown at Agassiz in 1891. More than 70 varieties were tested in one or more of the years from 1891 to 1915, inclusive. The annual yields are reported in Table 15.

A comparison was made of six groups of barley. The Thorpe was the best of the six. The Manchuria was almost as good as the Thorpe, while the Hybrid, Chevalier, Hanna, and Himalaya groups follow in the order named. There were not sufficient varieties of the Coast type to include a Coast group. Ten well-known varieties of various types are compared in the summarized digest of Table 15. Hannchen (C. I. No. 531) was grown only four years, but was superior to the other nine varieties for the years in which the yields were comparable. Mensury (C. I. No. 2657) exceeded all varieties except Hannchen. Since Blue Long Head (C. I. No. 2685), Danish Chevalier (C. I. No. 180), Canadian Thorpe (C. I. No. 740), and Odessa (C. I. No. 182) also produced good yields, it is evident that barleys of many types grow well in the valley in which Agassiz is situated. This is not true in the barley-growing districts of California, eastern Oregon, and Washington, where varieties of the Coast type are outstanding.

TABLE 15.—*Annual acre yields of varieties of barley grown at the Agassiz (British Columbia) Experimental Farm in part or all of the 25 years from 1891 to 1915, inclusive*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C.I. No.	Acre yields (bushels)																									Years grown	Average yield (bus.)	Percentage of weighted mean
		1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915			
Golden Melon	411	36.0	21.9	29.0																							3	29.0	105.1
Saale	2645	33.6	27.9																								2	30.7	105.5
Prize Prolific	169	32.7		16.9	18.6	33.3	29.2	32.5	36.3	30.8	36.3	59.2	43.3														11	33.6	97.1
Thanet	2652	24.0		20.6	12.1	32.5	25.8	31.3	22.9	33.7																	8	25.4	83.8
Duckbill	1916	24.2	30.6	24.2	30.4	44.0	28.3																				6	30.3	111.4
Kinver Chevalier	587	20.8	23.3	22.3	18.3	28.3	39.6	40.8	40.0	29.2	32.5	50.8	48.3														12	32.9	95.9
Peerless White	2647	29.0	26.9																								2	27.9	95.9
Sharpe Chevalier	2650	32.9	28.1	20.5	21.1																						4	25.7	98.1
Danish Chevalier	180	33.7	27.9	30.8		39.6	40.0	31.3	33.3	33.7	37.1	47.1	37.5	65.4	56.7	35.8	41.3	53.3	58.3	51.3	61.5	33.7	41.3	37.5	45.0	70.3	24	43.5	108.7
Goldthorpe	327	42.1	28.1	30.9	29.9	44.2	30.0																				6	34.2	125.7
Golden Grain	588	27.7	30.1	34.4	29.8	32.7	28.2																				6	30.5	112.1
Baxter	185	37.5		25.4	18.3		28.3	32.6	34.6	40.8	38.9	53.7	35.6	64.6	54.6												12	38.7	99.7
Rennie Improved	181	36.0	27.9	23.8	11.3	28.3	19.6	37.5	27.9	30.0		54.6	52.5	65.4	45.0	49.2											14	36.3	93.8
Odessa	182	31.3	23.7	22.8	31.3	38.7	25.0	33.7	34.2	32.1	40.4	59.2	38.3	58.3	57.3	48.3	47.1	42.1	47.5	54.2	50.2	36.9	38.7	28.3	46.3	33.1	25	40.0	101.3
Oderbrucker	2700	22.8	14.0	28.0	20.0	36.6	28.3	40.4	29.6	40.4	38.3	51.9	50.8	71.3	58.3	50.0	35.0	43.5	44.6	51.0	42.7	34.4	41.3	26.7	42.5	60.3	25	40.1	101.5
Common	184	57.3	19.4	35.8	16.1	28.1	29.2	38.3	34.6	30.8	38.9	60.8	30.4	67.1	56.3	47.5	36.7										16	39.2	102.1
Himalaya	1934	41.9	22.1	20.3																							3	28.1	101.8
Mensury	2657	35.8	28.3	25.1		27.9	28.4	38.3	37.5	38.3	44.2	59.6	38.7	80.0	62.5	53.6	49.6	45.2	46.7	50.4	44.6	28.7					20	43.2	108.3
Spiti Valley	2664	20.5	19.2																								2	19.9	68.4
French Chevalier	175			25.5	22.9	38.3	44.2	37.1	31.7	30.0	34.6	51.9	33.3	70.8	52.1	46.5	41.9	41.7	51.7	40.5	41.5						18	40.9	102.0
Canadian Thorpe	740			24.8	27.3	41.7	42.5	37.1	27.9	36.7	31.7	50.4	46.7	69.6	56.0	51.7	32.9	48.7	42.9	55.0	61.3	33.7	46.3	33.3	38.7	50.0	23	42.9	107.3
Newton	172			16.7	28.8	34.2	18.4	31.3	33.3	39.2	31.5	51.9	40.5	62.9	50.2	55.0											13	38.0	97.4
Petschora	2658			23.7	16.7	33.3	17.9	38.3	28.7	32.3	39.8	55.4	35.2														10	32.1	92.5
California Prolific	2649				37.1	24.6	25.4																				3	29.0	107.8
Beaver	1915				23.8	36.0	37.1	28.7	39.2	31.3	34.2	61.0	33.1	75.0	50.4	51.3	37.5	42.7	50.0	53.7	43.1	35.0	42.5	34.2	43.7	86.6	22	44.1	108.9
Royal	1252				17.1	29.8	25.5	36.5	38.3	34.6	32.3	67.5	39.6	68.7	46.3	44.2	31.7										13	39.4	99.7
Phoenix	2676				15.0	28.8	15.0	33.3	40.0	35.6	36.5	53.0	35.8														9	32.5	92.1
Monck	2703					38.6	16.3	28.3	25.8	30.8																	5	28.0	88.9
Bolton	177					30.5	27.1	28.1	31.3	33.3	31.9	50.8	29.6														8	32.8	91.1
Victor	179					27.7	24.2	30.4	29.2	34.6	34.6	45.8	31.1														8	32.2	89.4
Sidney	178					27.3	22.1	27.5	30.8	33.7	30.4	37.9	39.2	73.3	56.4	39.2	41.0	52.5	52.7								14	40.3	98.8
Rigid	2682					26.3	20.0	27.1																			3	24.5	81.4
Trooper	173					34.0	22.5	32.6	35.0	32.9	38.7	50.8	36.6	65.4	50.1	33.3	39.2	48.5	49.2	43.1	41.9	31.3	33.7	30.0	46.3	68.7	21	41.1	100.2
Stella	2678					32.1	19.6	34.2	34.2	35.4	29.6	47.3	37.1	72.5	53.6	50.2	37.5	39.2	40.0	50.8		32.5					16	40.4	99.0
Vanguard	2665					31.3	16.7	37.5	31.5	31.3	36.9	47.3	39.4														8	34.0	94.4
Summit	174					28.0	24.6	33.5	35.8	32.9	29.8	47.1	55.0	60.4	50.8	39.2	33.3	42.5									13	39.5	97.3
Champion	2683					26.7	20.0	33.3	35.4	36.4	37.7	51.1	38.1	61.7	53.1	45.8	35.8	41.9	30.8								14	39.1	95.8

TABLE 15.—*Annual acre yields of varieties of barley grown at the Agassiz (British Columbia) Experimental Farm in part or all of the 25 years from 1891 to 1915, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																									Years grown	Average yield (bus.)	Percentage of weighted mean
		1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915			
Success	2707	----	----	----	----	24.3	15.4	32.2	32.9	32.5	27.7	50.6	34.4	----	----	----	----	----	----	----	----	----	37.5	30.8	27.5	33.1	12	31.6	86.1
Surprise	171	----	----	----	----	24.2	18.7	33.9	25.0	34.4	----	45.8	50.8	----	----	----	----	----	----	----	----	----	----	----	----	----	7	33.3	92.0
Nugent	176	----	----	----	----	23.9	19.2	35.4	28.3	40.0	41.3	61.3	40.0	65.4	47.5	55.4	39.4	38.3	36.7	55.8	41.9	30.0	----	----	----	----	17	41.2	100.5
Pioneer	2677	----	----	----	----	22.5	26.3	36.3	35.4	33.3	35.8	52.3	29.8	----	----	----	----	----	----	----	----	----	----	----	----	----	8	34.0	94.4
Excelsior	2684	----	----	----	----	----	23.7	30.0	34.6	32.7	37.1	54.6	35.0	----	----	----	----	----	----	----	----	----	----	----	----	----	7	35.4	97.0
Pacer	2667	----	----	----	----	----	16.7	29.2	34.2	30.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	4	27.6	87.9
Nepean	183	----	----	----	----	----	15.8	32.9	25.0	35.8	41.4	52.5	36.7	----	----	----	----	----	----	----	----	----	----	----	----	----	7	34.3	94.0
Mansfield	2241	----	----	----	----	----	----	----	34.6	33.3	33.8	59.4	39.0	----	48.7	46.7	32.5	50.2	35.8	42.5	46.9	35.0	38.7	32.5	43.7	----	16	40.8	98.6
Empire	2680	----	----	----	----	----	----	----	36.3	33.7	28.3	58.6	32.7	68.7	55.4	49.6	46.7	55.0	44.2	----	----	----	----	----	----	----	11	46.3	106.4
Argyle	2681	----	----	----	----	----	----	----	36.7	37.9	36.5	58.3	34.2	65.8	55.0	54.2	36.5	49.0	----	----	----	----	----	----	----	----	10	46.4	106.9
Kirby	2671	----	----	----	----	----	----	----	25.8	----	----	47.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	36.7	84.8
Logan	2668	----	----	----	----	----	----	----	29.2	35.8	29.4	51.3	25.2	61.3	67.9	25.8	27.1	39.6	----	----	----	----	----	----	----	----	10	39.3	90.6
Dunham	2670	----	----	----	----	----	----	----	29.2	34.2	30.2	50.0	52.9	76.7	49.2	36.3	41.7	56.3	----	----	----	----	----	----	----	----	10	45.7	105.3
Leslie	2669	----	----	----	----	----	----	----	30.0	33.5	29.4	53.0	35.4	----	----	----	----	----	----	----	----	----	----	----	----	----	5	36.3	94.0
Jarvis	2672	----	----	----	----	----	----	----	----	35.0	41.7	50.8	33.7	56.7	52.5	37.7	34.2	40.0	49.6	46.7	50.4	----	----	----	----	----	12	44.1	98.0
Harvey	2675	----	----	----	----	----	----	----	----	35.0	33.6	51.0	40.6	65.8	48.3	41.7	40.8	----	----	----	----	----	----	----	----	----	8	44.6	100.2
Clifford	1910	----	----	----	----	----	----	----	----	34.2	28.2	46.5	36.0	59.6	45.8	42.5	46.7	42.9	48.7	35.8	49.0	36.3	35.0	31.7	----	----	15	41.3	94.1
Fulton	2706	----	----	----	----	----	----	----	----	32.9	30.2	38.3	30.0	57.8	50.0	----	----	----	----	----	----	----	----	----	----	----	6	39.9	88.7
Albert	1551	----	----	----	----	----	----	----	----	40.6	38.7	54.6	37.5	61.7	63.7	52.5	34.2	50.8	39.2	34.6	39.4	----	----	----	----	----	12	45.6	101.3
Yale	1592	----	----	----	----	----	----	----	----	35.2	40.0	58.7	40.2	55.0	48.6	49.6	39.2	54.8	37.5	50.6	54.6	27.5	36.3	27.5	----	----	15	43.7	99.5
Brome	2679	----	----	----	----	----	----	----	----	34.2	32.1	52.3	37.7	71.7	57.5	52.7	36.3	----	----	----	----	----	----	----	----	----	8	46.8	105.2
Garfield	2673	----	----	----	----	----	----	----	----	33.7	32.2	47.1	37.9	55.0	51.3	----	----	----	----	----	----	----	----	----	----	----	6	42.9	95.3
Claude	1557	----	----	----	----	----	----	----	----	32.7	40.2	60.8	39.2	62.1	60.8	45.4	42.9	42.9	33.3	35.8	39.2	----	----	----	----	----	12	44.6	99.1
Black Hull-less	596	----	----	----	----	----	----	----	----	29.2	26.8	45.4	36.7	----	----	----	----	----	----	----	----	----	----	----	----	----	4	34.5	86.3
Nepal	595	----	----	----	----	----	----	----	----	16.7	----	45.0	39.2	----	----	----	----	----	----	----	----	----	----	----	----	34.4	4	33.8	79.7
Blue Long Head	2685	----	----	----	----	----	----	42.5	26.7	32.5	37.9	57.1	32.9	----	----	49.8	43.3	40.0	55.8	----	----	----	----	----	----	----	10	41.9	105.3
Standwell	584	----	----	----	----	----	----	----	----	----	----	55.8	37.9	67.1	56.3	46.7	40.0	57.5	52.5	49.2	52.7	40.6	----	----	----	----	11	50.6	107.0
Gordon	2674	----	----	----	----	----	----	----	----	----	----	46.7	38.1	73.5	51.3	29.2	34.7	47.5	38.3	36.7	----	----	----	----	----	----	9	44.0	91.7
Invincible	590	----	----	----	----	----	----	----	----	----	----	34.2	48.5	66.3	46.3	49.6	36.7	48.3	50.8	45.8	50.6	36.9	43.7	29.2	40.0	56.3	15	45.5	98.1
Chevalier II	200	----	----	----	----	----	----	----	----	----	----	----	----	----	----	52.5	42.3	42.5	49.2	49.6	60.2	38.7	47.5	33.3	36.3	55.0	11	46.1	107.0
O. A. C. 21	1470	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50.2	27.5	35.0	26.7	42.5	33.1	6	35.8	86.7
Hannchen	531	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	64.7	33.1	50.0	34.2	----	----	4	45.5	116.4
Manchurian	739	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	29.4	41.3	25.8	38.7	46.9	5	36.4	92.9
Gold	1145	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.3	57.5	2	49.4	105.6
Prentice	917	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	42.5	50.6	2	46.5	99.4

Summarized Digest, Showing the Relative Performance of 10 Representative Varieties

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C.I. No.	Data shown	Varieties and percentages									
			Danish Chevalier	Canadian Thorpe	Hann-chen	Mensury	Pet-schora	Odessa	Blue Long Head	Nepal	Beaver	Success
Danish Chevalier	180	Years comparable		22	4	20	9	24	10	4	21	12
		Percentage yield		102.3	95.6	98.4	108.5	107.8	97.7	139.4	100.5	130.3
Canadian Thorpe	740	Years comparable	22		4	18	10	23	10	4	22	12
		Percentage yield	97.7		95.9	99.0	114.2	104.5	97.2	135.8	99.2	127.5
Hannchen	531	Years comparable	4	4		2	(*)	4	(*)	(*)	4	2
		Percentage yield	104.6	104.2		133.4		118.1			117.6	123.3
Mensury	2657	Years comparable	20	18	2		9	20	10	3	17	8
		Percentage yield	101.7	101.0	74.9		111.0	105.1	107.9	135.4	104.7	125.2
Petschora	2658	Years comparable	9	10	(*)	9		10	6	3	9	8
		Percentage yield	92.2	87.6		90.1		90.3	100.0	121.8	91.7	112.4
Odessa	182	Years comparable	24	23	4	20	10		10	4	22	12
		Percentage yield	92.7	95.7	84.7	95.1	110.7		101.1	120.3	95.0	118.2
Blue Long Head	2685	Years comparable	10	10	(*)	10	6	10		3	10	6
		Percentage yield	102.4	102.9		92.6	100.0	99.0		121.4	102.3	109.2
Nepal	595	Years comparable	4	4	(*)	3	3	4	3		4	4
		Percentage yield	71.7	73.6		73.9	82.1	83.2	82.4		63.8	89.8
Beaver	1915	Years comparable	21	22	4	17	9	22	10	4		12
		Percentage yield	99.5	100.8	85.1	95.5	109.0	105.3	97.7	156.7		134.0
Success	2707	Years comparable	12	12	2	8	8	12	6	4	12	
		Percentage yield	76.7	78.4	81.1	79.9	89.0	84.6	91.6	111.3	74.6	

SIDNEY, BRITISH COLUMBIA

At Sidney, British Columbia, two varieties of spring barley were grown in 1914 and 1915 and two varieties of winter barley in 1915. The yields are reported in Table 16. The number of varieties tested was not sufficient to determine the general type of barley best suited to the region. The spring varieties, however, were superior to the winter varieties. The yields were not so good as those obtained at Agassiz in the same years.

TABLE 16.—*Annual acre yields of varieties of barley grown at the Sidney (British Columbia) Experimental Station in one or both of the years 1914 and 1915*

[Data compiled from the Canadian Experimental Farms Reports]

Variety	C. I. No.	Acre yields (bushels)		Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915			
Spring barley:						
Manchurian	739	30.0	35.2	2	32.6	112.8
Canadian Thorpe	740	23.1	34.9	2	29.0	100.3
Winter barley:						
Arlington Awnless	702	----------	30.0	1	30.0	99.7
Tapp Winter	1707	----------	20.5	1	20.5	68.1

INVERMERE, BRITISH COLUMBIA

Barley yields were reported from Invermere, British Columbia, only for the year 1915. Four varieties were tested during that year. The yields were as follows: Manchurian (C. I. No. 739), 25 bushels; Gold (C. I. No. 1145), 24.2 bushels; Early Chevalier (C. I. No. 2725), 20 bushels; Success (C. I. No. 2707), 16.9 bushels. In this year at Agassiz and Sidney barleys of the Manchuria type gave very good yields.

DATA FROM NORTHERN AND WESTERN STATIONS IN THE UNITED STATES

The data from the agricultural experiment stations in the United States are presented in two sections, namely, (1) those from northern and western stations and (2) those from southern stations. As noted previously, the stations are arranged in sequence from east to west in each section.

The yields of barley at the Canadian stations which have been followed across Canada from east to west can be used as a background for interpreting the results of experiments at the stations in the northern United States. The barley area in the United States with the exception of the Southwest lies mostly along the Canadian border. The tests at stations in Canada have been more extensive and less subject to interruption than those at experiment stations in the United States. The results at points just north of our northern border are fully applicable to our northern tier of States. In many cases the Canadian stations are closer to the northern counties of our States than are our own stations.

ORONO, ME.

In the annual reports of the Maine Agricultural Experiment Station from 1886 to 1889, yields are given for seven varieties of barley. These yields are reported in Table 17. It will be seen that the best two varieties were Chevalier (C. I. No. 2802) and Champion of Vermont (C. I. No. 1892). The latter is a barley of the Hanna type. The Golden Melon (C. I. No. 411) and Imperial (C. I. No. 2805) are barleys of the Thorpe group, but Mensury (C. I. No. 2657) belongs to the Manchuria group. It is of special interest that the Hanna type gave good yields in Maine, for it will be remembered that the Chevalier barleys were best adapted to Prince Edward Island and Manchuria to the mainland of eastern Canada, while Hanna was not particularly promising. But Hanna has long been known to be a good barley in New England and New York State. In other words, the Hanna barleys are adapted to a somewhat warmer district than those of the Chevalier type.

TABLE 17.—*Annual acre yields of varieties of barley grown at the Maine Agricultural Experiment Station (at Orono) in some or all of the four years from 1886 to 1889, inclusive*

[Data obtained through the courtesy of the Maine Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1886	1887	1888	1889			
Sibley Imperial	2805	28.7	17.1	20.8	--------	3	22.2	80.7
Mensury	2657	28.7	16.7	33.1	--------	3	26.2	95.3
Chevalier	2802	23.2	19.6	50.4	33.9	4	31.8	110.8
Nepal	595	17.1	32.5	31.2	--------	3	26.9	97.8
Golden Melon	411	26.5	18.8	34.2	--------	3	26.5	96.4
Black Hull-less	596	21.0	24.6	25.0	--------	3	23.5	85.5
Champion of Vermont	1892	--------	34.8	46.7	46.3	3	42.6	140.1

DURHAM, N. H.

Through the courtesy of the New Hampshire Agricultural Experiment Station, barley yields for the years 1908 and 1909 were supplied for this bulletin (Table 18). The varieties were not tested for a sufficient number of years to show which types were superior. In 1908 the best variety was a 2-rowed brewing barley which has not been identified. Seedsmen of the northeast district often sell seed barley as Two-Row Brewing. Hanna is more often sold under this name than any other variety, and it is probable that the barley grown in 1908 was of this sort. In 1909 Horsford gave the highest yield. This is not consistent with the behavior of Horsford at other points, and it is likely that it would not maintain this high relative position if it were grown for a period of years.

TABLE 18.—*Annual acre yields of varieties of barley grown at the New Hampshire Agricultural Experiment Station (at Durham) in one or both of the years 1908 and 1909*

[Data obtained through the courtesy of the New Hampshire Agricultural Experiment Station]

Variety	C. I. No.	Acre yield (bushels)		Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909			
Two-Row Brewing	3178	22.9	18.7	2	20.8	110.1
Manchuria	244	18.7	18.9	2	18.8	99.5
Oderbrucker	537	12.1	----------	1	12.1	81.7
Nepal	595	5.4	----------	1	5.4	36.5
Horsford	507	----------	29.1	1	29.1	131.1
Caswell	3170	----------	26.1	1	26.1	117.6
Black Hull-less	596	----------	18.4	1	18.4	82.9

KINGSTON, R. I.

Barleys have not been grown in varietal tests at the Rhode Island Agricultural Experiment Station. Through the courtesy of the station a few yields have been furnished from barley plats utilized in fertilizer and other experiments. In 1910 a plat of Manchuria (C. I. No. 241) yielded 10.5 bushels of grain. The same variety grown in 1913 produced 24.2 bushels and in 1914 12.8 bushels. In 1910 a second plat of Manchuria barley produced 28 bushels. These results show nothing of the relative value of types of barley, but they give an idea of the range of yields which might be expected in Rhode Island.

STORRS, CONN.

The results at Storrs, Conn., were furnished through the courtesy of the Connecticut Agricultural Experiment Station (Table 19). Few varieties were tested for more than one or two years. Barley is not an important crop in Connecticut, and the varietal tests have not been extensive. Two of the best sorts were Heil Hanna (C. I. No. 681) and Franconian (C. I. No. 680). These are both of the Hanna group, and the results agree with those in Maine. French Chevalier (C. I. No. 175) was grown for two years but was inferior to the two Hanna varieties. Oderbrucker (C. I. No.1273) yielded slightly more than either Hanna. It would seem that varieties of the Hanna and the Manchuria types are best adapted to Connecticut, while Chevalier and Duckbill (C. I. No. 1916) are but slightly inferior.

Table 19.—*Annual acre yields of varieties of barley grown at the Connecticut Agricultural Experiment Station (at Storrs) in one or more of the eight years from 1914 to 1921, inclusive*

[Data obtained through the courtesy of the Connecticut Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915	1916	1917	1919	1920	1921			
Heil Hanna 1	681	35.4	46.0	42.6	42.6	------	------	------	4	41.7	117.5
Manchuria	244	30.4	------	------	------	------	------	------	1	30.4	105.2
French Chevalier	175	29.2	44.1	------	------	------	------	------	2	36.7	106.4
Himalaya	620	21.7	------	------	------	------	------	------	1	21.7	75.1
Duckbill	1916	32.9	46.9	24.0	------	------	------	------	3	34.6	100.9
O. A. C. 21	1470	29.6	------	------	------	32.0	35.4	------	3	32.3	104.5
Success Beardless	1808	25.0	34.7	------	------	------	------	------	2	29.9	86.7
Franconian	680	34.4	47.9	31.7	42.6	------	------	------	4	39.1	110.1
Heil Hanna 4	677	21.2	------	------	------	------	------	------	1	21.2	73.4
Champion of Vermont	1892	24.8	------	------	------	------	------	------	1	24.8	85.8
Oderbrucker	1273	33.1	49.7	------	46.0	------	37.8	26.6	5	38.6	109.3
Wisconsin Pedigree	835	------	------	------	------	33.7	38.2	26.9	3	32.9	100.0

ITHACA, N. Y.

The results of varietal tests of barley are available from Cornell University, Ithaca, N. Y., from 1913 to 1921, inclusive. The annual yields are reported in Table 20. It will be seen that most of the varieties are those which have come into experiment stations for testing during recent years. A comparison was made of six groups of barley, of which the Manchuria was the best. The Hybrid group gave yields next to Manchuria, the Hanna was third, and the Chevalier fourth. Neither the Thorpe nor the Horsford group was promising. In the summarized digest of the table a comparison of 12 varieties is shown. The best five of these are Featherston (C. I. No. 1120), Alpha (C. I. No. 959), Hanchamont (C. I. No. 1121), Champion of Vermont (C. I. No. 1892), and Trebi (C. I. No. 936). There is very little difference in the yield of these varieties. Although the Manchuria group ranks highest as a group, there are three barleys of the Hanna type among the five just named. These are Champion of Vermont, Alpha, and Hanchamont, the two latter being of hybrid origin. The barleys of the Hanna type are relatively better adapted to New York conditions than they are to the sections north and east. The Chevalier sorts, which were superior in Prince Edward Island and promising in New England, did not produce high yields here. The Manchuria barleys, on the other hand, grew exceptionally well. The summers in New York are not so hot as in other parts of the humid-spring region. In consequence some varieties succeed which do not seem primarily suited to New York conditions. Trebi (C. I. No. 936), which has done so well under irrigation in southern Idaho, has also yielded well in New York State. New York is probably at the western edge of that section of the Northeastern States where 2-rowed barley can be grown successfully. Because of the warmer summers of the valley lands farther west and in the region of Ottawa to the north, the Manchuria barleys grow best.

TABLE 20.—*Annual acre yields of varieties of barley grown at the New York Agricultural Experiment Station at Cornell University (at Ithaca) in one or more of the nine years from 1913 to 1921, inclusive*

[Data obtained in cooperation with the New York Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1918	1919	1920	1921			
Oderbrucker	836	42.6	47.3	44.9	------	28.6	32.5	33.7	48.9	7	39.8	109.0
Do	2700	44.9	46.1	------	------	------	------	------	------	2	45.5	112.6
Wisconsin Pedigree	835	46.3	50.6	------	------	27.5	------	------	------	3	41.5	116.2
Silver King	890	46.2	46.4	44.9	34.8	26.7	33.4	34.3	38.6	8	38.2	107.6
Manchuria	2949	43.9	47.1	48.2	33.8	25.2	------	------	------	5	39.7	109.4
Do	241	40.2	46.2	42.5	34.8	29.7	33.7	------	------	6	37.9	106.8
Do	2944	44.0	44.7	45.7	------	------	------	------	------	3	44.8	109.0
Do	2950	40.2	48.1	45.0	------	------	------	------	------	3	44.4	108.0
Do	2952	41.3	45.8	43.7	------	------	------	------	------	3	43.6	106.1
Do	2946	42.2	47.3	43.0	------	------	------	------	------	3	44.2	107.5
Do	2945	41.7	46.8	47.1	33.9	25.8	------	------	------	5	39.1	107.7
Do	244	44.2	48.0	44.5	31.9	28.5	------	------	------	5	39.4	108.5
Do	2951	40.0	47.8	47.8	40.7	24.0	------	------	------	5	40.1	110.5
Baxter	185	43.3	45.9	46.1	------	------	------	------	------	3	45.1	109.7
Manchuria	882	42.7	48.5	47.3	35.0	27.0	32.3	------	------	6	38.8	109.3
Canadian	2635	32.9	36.6	45.5	------	------	------	------	------	3	38.3	93.2
Hanna	319	38.0	36.2	36.3	------	34.9	39.3	31.5	------	6	36.1	99.2
Hannchen	531	45.8	47.1	41.5	26.9	31.8	23.2	------	------	6	36.1	101.7
Silver King	905	36.2	47.2	45.0	------	------	------	------	------	3	42.8	104.1
Hanna	1854	35.7	46.7	47.8	34.8	32.3	36.3	33.1	------	7	38.1	107.9
New Zealand	2656	35.7	43.1	35.8	------	------	------	------	------	3	38.2	92.9
Champion of Vermont	1892	34.0	49.3	44.9	37.2	33.3	37.2	34.7	------	7	38.7	109.6
Horsford	507	30.8	31.6	38.2	------	------	------	------	------	3	33.5	81.5
Evans	892	29.4	30.4	29.9	------	------	------	------	------	3	29.9	72.7
Himalaya	620	27.5	38.0	25.3	12.5	10.9	16.7	------	------	6	21.8	61.4
Nepal	595	19.8	24.8	18.7	------	17.5	7.7	------	------	5	17.7	48.1
California Prolific	2649	23.1	32.2	27.7	------	------	------	------	------	3	27.7	67.4
White Smyrna	910	26.9	34.8	39.4	24.2	------	------	------	------	4	31.3	82.2
Bohemian	933	28.7	41.3	31.6	18.1	------	------	------	------	4	29.9	78.5
Chevalier II	200	------	40.0	34.0	22.1	------	------	------	------	3	32.0	83.8
Primus	532	------	31.9	38.0	17.8	------	------	------	------	3	29.2	76.4
Princess	529	------	40.9	33.7	------	------	------	------	------	2	37.3	88.6
Gold	1145	------	46.5	43.9	28.0	------	------	------	------	3	39.5	103.4
Svanhals	187	------	47.6	38.0	23.9	------	------	------	------	3	36.5	95.5
Featherston	1120	------	51.7	57.0	41.2	27.1	34.6	29.8	42.6	7	40.6	115.3
Do	954	------	31.4	36.4	29.6	------	------	------	------	3	32.5	85.1
Trebi	936	------	43.4	51.3	35.3	34.9	36.2	32.3	39.1	7	38.9	110.5
Servian	915	------	44.4	41.2	32.7	------	------	------	------	3	39.4	103.1
Sandrel	937	------	32.9	40.0	31.5	------	------	------	------	3	34.8	92.1
Manchuria	1178	------	------	39.0	29.6	------	------	------	------	2	34.3	93.2
Alpha	959	------	------	52.6	41.0	33.6	38.9	34.3	25.5	6	37.7	110.6
Hanchamont	1121	------	------	45.4	40.0	32.6	39.8	40.1	25.7	6	37.3	109.4
Hanna	1122	------	------	43.8	26.5	------	------	------	------	2	35.1	95.4
Frankish	953	------	------	45.7	28.6	32.5	27.8	------	------	4	33.7	99.4
Manchuria	956	------	------	42.1	30.4	------	------	------	------	2	36.3	98.6
Oderbrucker	957	------	------	48.5	32.6	23.8	32.7	------	------	4	34.4	101.5
Cortile	1123	------	------	38.8	26.7	------	------	------	------	2	32.7	88.9
Featherston	1118	------	------	43.8	31.4	------	------	------	------	2	37.6	102.2
Luth	972	------	------	51.0	33.5	30.0	34.7	34.5	------	5	36.7	108.6
Red River	973	------	------	47.7	35.2	30.7	33.1	------	------	4	36.7	108.3
Featherston	1119	------	------	52.6	34.2	29.1	------	------	------	3	38.6	111.6
Lion	923	------	------	34.2	28.1	------	------	------	------	2	31.2	84.8
Hanna	906	------	------	45.3	28.9	33.9	30.0	------	------	4	34.5	101.8
Steigum	907	------	------	41.5	32.6	34.7	34.1	------	------	4	35.7	105.3
Goldfoil	928	------	------	41.4	33.8	30.3	------	------	------	3	35.2	101.7
Australian White	925	------	------	37.2	24.0	------	------	------	------	2	30.6	83.2
Mahrische	912	------	------	45.4	34.5	33.8	30.6	------	------	4	36.1	106.5
Italian	914	------	------	34.5	25.1	------	------	------	------	2	29.8	81.0
Odessa	916	------	------	40.0	31.8	------	------	------	------	2	35.9	97.6
Do	927	------	------	47.3	32.4	------	------	------	------	2	39.9	108.4
Club Mariout	932	------	------	38.2	33.6	------	------	------	------	2	35.9	97.6
Eagle	913	------	------	48.0	30.8	28.0	------	------	------	3	35.6	102.9
Peruvian	935	------	------	41.0	29.3	------	------	------	------	2	35.1	95.4
Featherston	911	------	------	44.7	31.4	28.0	------	------	------	3	34.7	100.3
Luth	908	------	------	41.9	28.2	------	------	------	------	2	35.1	95.4
Summit	929	------	------	39.2	26.2	------	------	------	------	2	32.7	88.9
Proskowetz	893	------	------	40.4	29.1	32.8	31.7	31.8	------	5	33.2	98.2
Scholey	962	------	------	44.9	25.9	------	------	------	------	2	35.4	96.2
Bolton	922	------	------	37.4	27.7	------	------	------	------	2	32.5	88.3
Horn	926	------	------	37.9	25.9	------	------	------	------	2	31.9	86.7
Oderbrucker	1272	------	------	------	------	27.0	33.5	38.8	46.0	4	36.3	116.3
Coast	690	------	------	------	------	31.5	32.4	------	------	2	31.9	108.1

TABLE 20.—*Annual acre yields of varieties of barley grown at the New York Agricultural Experiment Station at Cornell University (at Ithaca) in one or more of the nine years from 1913 to 1921, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1918	1919	1920	1921			
Manchuria	2823	------	------	------	------	29.9	33.5	37.5	43.4	4	36.1	115.7
O. A. C. 21	1470	------	------	------	------	29.2	31.9	29.6	39.8	4	32.6	104.5
Oderbrucker	1526	------	------	------	------	28.0	25.8	------	------	2	26.9	91.2
Wing Pedigree	1177	------	------	------	------	22.8	28.3	19.5	------	3	23.5	77.6
Black Hull-less	596	------	------	------	------	22.0	20.9	------	------	2	21.5	72.9
Beardless	1797	------	------	------	------	14.4	6.8	------	------	2	10.6	35.9
Hybrid	2636	------	------	------	------	36.2	28.2	33.9	23.4	4	30.4	97.4
Saul	1884	------	------	------	------	31.8	35.5	31.8	28.9	4	32.0	102.6
Charlottetown 80	2732	------	------	------	------	31.5	32.8	32.4	------	3	32.2	106.3
Hanna	1554	------	------	------	------	30.8	32.1	33.2	------	3	32.0	105.6
Hybrid	2637	------	------	------	------	29.5	30.5	29.8	------	3	29.9	98.7
Manchuria	2638	------	------	------	------	25.2	33.3	32.0	41.9	4	33.1	106.1
Selection	2639	------	------	------	------	------	------	36.4	47.7	2	42.1	120.3
Do	2640	------	------	------	------	------	------	35.6	43.4	2	39.5	112.9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 12 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same year. Under "Data shown" P=Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown	Varieties and percentages											
			Charlottetown 80	Svanhals	Champion of Vermont	Hannchen	Featherston	O. A. C. 21	White Smyrna	Nepal	Himalaya	Trebi	Alpha	Hanchamont
Charlottetown 80	2732	Y	------	(*)	3	2	3	3	(*)	2	2	3	3	3
		P		------	91.9	116.9	105.7	106.6	------	255.2	233.0	93.5	90.5	86.0
Svanhals	187	Y	(*)	(*)	3	3	3	(*)	3	2	3	3	2	2
		P	------	------	83.3	94.8	73.0	------	111.3	196.8	144.5	84.2	66.1	72.5
Champion of Vermont.	1892	Y	3	3	------	6	6	3	4	5	6	6	5	5
		P	108.8	120.0	------	109.1	98.0	116.0	132.0	224.5	180.2	101.4	93.5	94.6
Hannchen	531	Y	2	3	6	------	5	2	4	5	6	5	4	4
		P	85.5	105.5	91.7	------	80.6	90.0	128.7	214.0	165.2	84.8	74.3	78.2
Featherston	1120	Y	3	3	6	5	------	4	3	4	5	7	6	6
		P	94.6	136.9	102.0	124.1	------	102.8	152.3	248.0	204.6	104.2	102.8	103.9
O. A. C. 21	1470	Y	3	(*)	3	2	4	------	(*)	2	2	4	4	4
		P	93.8	------	86.2	111.1	97.3	------	------	242.5	221.4	91.6	98.6	94.4
White Smyrna	910	Y	(*)	3	4	4	3	(*)	------	3	4	3	2	2
		P	------	89	75.8	77.7	65.6	------	------	159.7	121.3	75.7	67.9	74.5
Nepal	595	Y	2	2	5	5	4	2	3	------	5	5	3	3
		P	39.2	50.8	44.5	46.7	40.3	41.2	62.6	------	74.7	41.4	35.1	37.3
Himalaya	620	Y	2	3	6	6	5	2	4	5	------	5	4	4
		P	42.9	69.2	55.5	60.5	48.9	45.2	82.4	133.8	------	51.4	39.4	41.4
Trebi	936	Y	3	3	6	5	7	4	3	4	5	------	6	6
		P	106.9	118.7	98.6	117.9	96.0	109.2	132.1	241.3	194.5	------	101.4	102.5
Alpha	959	Y	3	2	5	4	6	4	2	3	4	6	------	6
		P	110.4	151.2	107.0	134.6	97.2	101.4	147.2	285.0	254.0	98.6	------	101.0
Hanchamont	1121	Y	3	2	5	4	6	4	2	3	4	6	6	------
		P	116.3	138.0	105.7	127.9	96.3	105.9	134.3	268.3	241.3	97.6	99.0	------

STATE COLLEGE, PA.

The results from Pennsylvania were furnished through the courtesy of the Pennsylvania Agricultural Experiment Station. Some of these were published in the annual reports of the station. Experiments were carried at three points in Pennsylvania. From the central farm, yields are available for the years 1869, 1870, 1872, 1873, 1888, 1889, 1911, and from 1917 to 1921, inclusive. Results from the eastern farm are at hand for only the five years, 1869 to 1873, inclusive, and from the western farm for the years 1870, 1872, and 1873. The annual yields are given in Table 21. While it is very difficult to compare a few varieties grown scatteringly over so many years, it is obvious that both the 2-rowed and Manchuria barleys did well. Good yields were obtained from Charlottetown

80 (C. I. No. 2732) and Michigan (C. I. No. 2782) in recent years. Wisconsin Pedigree (C. I. No. 835) did not yield so high as might be expected in view of the fact that Manchuria (C. I. No. 241) yielded well the two years in which it was grown. At the eastern farm the 2-rowed varieties were promising. The best yielding barley was a winter sort which was grown for two years. The winter barleys usually show up relatively better than their actual value, owing to the fact that they are soon discontinued on account of winterkilling and the final year of failure is not reported. Probstier (C. I. No. 122), a barley of the Hanna group, gave a relatively high yield for the entire five years. Two North African varieties, Coast (C. I. No. 690) and Cape (C. I. No. 557), were entirely out of their region of adaptation and produced very low yields.

The results at the western farm are not consistent. The yields are low except in 1873, when only a few varieties were grown. The Common barley, which was probably of the Manchuria type, was better than the average. While the tests in Pennsylvania are neither extensive nor conclusive, they indicate that Pennsylvania belongs in the same district as New York, that is, the Hanna and Manchuria barleys probably are the ones best adapted. In southeastern Pennsylvania it is probable that the winter barleys would give higher returns and would not winterkill with such frequency as to make their culture unprofitable.

TABLE 21.—*Annual acre yields of varieties of barley grown at the Pennsylvania Agricultural Experiment Station (at State College) in one or more of the 13 stated years in the 53-year period from 1869 to 1921, inclusive*

[Data obtained through the courtesy of the Pennsylvania Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)													Years grown	Average yield (bus.)	Percentage of weighted mean
		1869	1870	1871	1872	1873	1888	1889	1911	1917	1918	1919	1920	1921			
Central farm:																	
Saxonian	2803	32.2	10.7	----	11.4	----	----	----	----	----	----	----	----	----	3	18.1	120.7
Probstier	122	28.3	11.7	----	----	----	----	----	----	----	----	----	----	----	2	20.0	109.3
Common	3112	----	20.4	----	15.4	7.3	----	----	----	----	----	----	----	----	3	14.4	123.1
Rottingham	3113	----	8.2	----	----	----	----	----	----	----	----	----	----	----	1	8.2	55.0
Golden Melon	411	----	16.0	----	6.7	----	----	----	----	----	----	----	----	----	2	11.3	89.0
Chevalier	2802	----	18.2	----	8.7	----	----	----	----	----	----	----	----	----	2	13.5	106.3
Brewers Delight	3114	----	18.9	----	7.3	----	----	----	----	----	----	----	----	----	2	13.1	103.1
Thanet	2652	----	----	----	11.1	3.3	----	----	----	----	----	----	----	----	2	7.2	80.9
Nepal	595	----	----	----	----	----	20.0	11.4	0	----	----	----	----	----	3	10.5	48.2
Manchuria	241	----	----	----	----	----	30.6	31.5	----	----	----	----	----	----	2	31.1	125.9
Black	256	----	----	----	----	----	----	23.1	----	----	----	----	----	----	1	23.1	94.3
Scotch	848	----	----	----	----	----	----	31.9	----	----	----	----	----	----	1	31.9	130.2
Charlottetown 80	2732	----	----	----	----	----	----	----	----	50.1	38.1	22.9	38.6	34.8	5	36.9	112.1
Horsford	1271	----	----	----	----	----	----	----	21.4	40.0	16.7	16.9	----	----	4	23.7	88.4
Wing Pedigree	1177	----	----	----	----	----	----	----	----	46.1	14.4	28.7	----	----	3	29.7	97.7
Michigan	2782	----	----	----	----	----	----	----	----	----	----	----	37.4	40.9	2	39.1	109.8
Wisconsin Pedigree	835	----	----	----	----	----	----	----	26.5	----	----	----	22.7	28.6	3	25.9	85.8
Lion	923	----	----	----	----	----	----	----	----	----	----	----	33.7	47.9	2	40.8	114.6
Eastern farm:																	
Coast	690	6.5	10.6	4.9	----	----	----	----	----	----	----	----	----	----	3	7.3	64.0
Probstier	122	12.2	10.6	9.2	18.0	16.7	----	----	----	----	----	----	----	----	5	13.3	126.7
Saxonian	2803	8.3	14.0	9.8	8.1	----	----	----	----	----	----	----	----	----	4	10.1	99.0
Winter (fall sown)	3115	45.0	11.5	----	----	----	----	----	----	----	----	----	----	----	2	28.3	193.8
Common Two-Row	3116	18.5	----	----	----	----	----	----	----	----	----	----	----	----	1	18.5	110.8
Nonpareil	3117	9.6	----	9.7	----	----	----	----	----	----	----	----	----	----	2	9.7	93.3
Rottingham	3113	----	14.0	5.0	----	----	----	----	----	----	----	----	----	----	2	9.5	97.9
Golden Melon	411	----	12.6	4.9	3.5	----	----	----	----	----	----	----	----	----	3	7.0	81.4
Chevalier	2802	----	10.6	5.0	1.3	----	----	----	----	----	----	----	----	----	3	5.6	65.1
Brewers Delight	3114	----	13.0	4.5	1.2	----	----	----	----	----	----	----	----	----	3	6.2	72.1
Common	3112	----	21.5	----	4.3	11.0	----	----	----	----	----	----	----	----	3	12.3	117.1
Cape	557	----	----	2.5	----	----	----	----	----	----	----	----	----	----	1	2.5	40.3
Thanet	2652	----	----	----	5.9	11.3	----	----	----	----	----	----	----	----	2	8.6	106.2
Western farm:																	
Saxonian	2803	----	12.3	----	17.4	----	----	----	----	----	----	----	----	----	2	14.9	108.8
Common	3112	----	10.2	----	16.0	32.5	----	----	----	----	----	----	----	----	3	19.6	117.4
Chevalier	2802	----	13.3	----	3.5	----	----	----	----	----	----	----	----	----	2	8.4	61.3
Thanet	2652	----	----	----	18.0	27.5	----	----	----	----	----	----	----	----	2	22.7	123.4
Golden Melon	411	----	----	----	17.0	----	----	----	----	----	----	----	----	----	1	17.0	116.4
Brewers Delight	3114	----	----	----	15.5	----	----	----	----	----	----	----	----	----	1	15.5	106.2

WOOSTER, OHIO

Results of barley tests at Wooster, Ohio, were furnished through the courtesy of the Ohio Agricultural Experiment Station from 1904 to 1921. Both winter and spring varieties were grown. As may be seen in Table 22, the winter varieties produced more grain per acre than the spring sorts. None of the Hanna type was included among the spring varieties, probably because they had not done well at the lower altitudes in the Mississippi Valley. Two 2-rowed barleys—Primus (C. I. No. 532) and Princess (C. I. No. 529)—were grown. These gave only fair yields and are probably not so well adapted to the section as even Hanna would be. Two varieties of the Manchuria type—Oderbrucker (C. I. No. 836) and Wisconsin Pedigree (C. I. No. 835)—were grown in most of the years since 1912. Wisconsin Pedigree gave higher yields in six of the nine years in which both of the varieties were grown. The barleys of the Tennessee Winter group were the best of the winter varieties grown. Ohio Winter (C. I. No. 2033), which is a locally adapted form of the Tennessee Winter group, was the best variety. Orel (C. I. No. 351), a 2-rowed barley, gave a very good yield but was not equal to the Ohio Winter in the only year in which it was grown. It is probable that in sections of Ohio the winter barleys are the better commercial group. In northwestern Ohio spring barleys are likely to be more dependable. Those of the Manchuria group are the best adapted of the spring varieties. They endure hot, moist weather at ripening time better than most other sorts and are therefore well adapted to culture in the upper Mississippi Valley.

TABLE 22.—*Annual acre yields of varieties of barley grown at the Ohio Agricultural Experiment Station (at Wooster) in one or more of the 18 years from 1904 to 1921, inclusive*

[Data obtained through the courtesy of the Ohio Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																	Years grown	Average yield (bus.)	Percentage of weighted mean
		1904	1905	1906	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Manchuria	2778	38.5	39.3	41.7	------	------	------	------	------	------	------	------	------	------	------	------	------	------	3	39.8	123.2
Ohio Beardless	231	25.9	18.3	32.7	------	------	------	------	------	------	------	------	------	------	------	------	------	------	3	25.6	79.3
Black Hull-less	596	41.9	22.1	30.1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	3	31.4	97.2
Oderbrucker	836	------	------	------	44.1	37.8	44.7	14.2	34.4	14.4	27.4	------	33.7	42.2	59.4	21.8	30.0	24.2	13	32.9	83.9
Primus	532	------	------	------	36.6	9.0	34.2	------	------	------	------	------	------	------	------	------	------	------	3	26.6	79.9
Princess	529	------	------	------	34.9	24.6	34.1	------	------	------	------	------	------	------	------	------	------	------	3	31.2	93.7
Wisconsin Pedigree	835	------	------	------	------	------	------	------	28.0	13.9	28.7	------	37.7	43.4	59.0	23.9	30.7	27.0	9	32.5	81.9
Winter barleys:																					
Texas Winter	554	------	------	------	------	------	------	51.0	------	------	53.6	61.2	58.3	63.5	42.5	54.9	13.5	------	8	49.8	108.5
Ohio Winter	2033	------	------	------	------	------	------	63.0	------	------	46.9	67.7	54.2	74.0	45.9	47.3	16.1	------	8	51.9	113.1
Maryland Winter	518	------	------	------	------	------	------	46.3	------	------	43.7	62.0	46.9	74.0	------	------	------	------	5	54.6	109.4
Tennessee Winter	257	------	------	------	------	------	------	57.3	------	------	40.1	62.0	------	------	------	------	------	------	3	53.1	109.5
Indiana Winter	2039	------	------	------	------	------	------	------	------	------	37.5	56.8	------	------	------	------	------	------	2	47.1	95.7
Wakamatsu	579	------	------	------	------	------	------	------	------	------	34.4	54.7	------	------	------	------	------	------	2	44.5	90.4
Orel	351	------	------	------	------	------	------	------	------	------	------	62.0	------	------	------	------	------	------	1	62.0	101.8
Michigan Winter	2036	------	------	------	------	------	------	------	------	------	------	------	------	------	39.1	55.4	26.6	------	3	40.4	107.2

EAST LANSING, MICH.

The yields from East Lansing, Mich., given in Table 23, were furnished through the courtesy of the Michigan Agricultural Experiment Station. They cover the six years from 1916 to 1921, inclusive. The results are best considered in two periods. During the three years, 1916 to 1918, inclusive, the yields of 13 varieties are reported. Hannchen (C. I. No. 531) was the best of the varieties grown for the three years, Chevalier II (C. I. No. 200) and Princess (C. I. No. 529) were equal in yield, and Svanhals (C. I. No. 187) ranked fourth. Gold (C. I. No. 1145) was highly productive for the two years in which it was grown. Oderbrucker (C. I. No. 1273), which was grown in 1917 and 1918, was the only variety of the Manchuria type included. In 1917 it was the second highest variety. In 1918 it was relatively inferior. During the years from 1919 to 1921, inclusive, a number of selections were grown. Since Gold is a Swedish variety, originating from a single plant, it is likely that the three selections of this variety were identical. Oderbrucker (C. I. No. 1273) was supposed to be pedigreed. The selections from Crawford, a local Michigan barley, were uniformly good. The selections from Gold were slightly inferior to Crawford, while Charlottetown 80 (C. I. No. 2732) was slightly less promising than Gold. The Oderbrucker and Manchuria varieties were slightly less than average in yield. In that section of Michigan in which East Lansing is located it is apparent that the Manchuria barleys are not so dominant as they were in Ohio, Indiana, or Ontario. Conditions in this section of Michigan are perhaps more like those in New York State, where barleys of the Hanna type are about on a par with those of the Manchuria type. However, there are doubtless sections in Michigan in which the Manchuria barleys would give higher yields than the Hanna barleys.

TABLE 23.—*Annual acre yields of varieties of barley grown at the Michigan Agricultural Experiment Station (at East Lansing) in two or three of the six years from 1916 to 1921, inclusive*

[Data furnished through the courtesy of the Michigan Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1916	1917	1918	1919	1920	1921			
Franconian	680	26.9	21.8	31.5				3	26.7	93.4
Svanhals	187	31.0	31.7	33.5				3	32.1	112.2
Chevalier II	200	33.5	30.6	38.6				3	34.2	119.6
Princess	529	35.4	29.1	38.1				3	34.2	119.6
Hannchen	531	44.6	18.3	35.4				3	32.8	114.7
Do	531	42.9	27.6	41.3				3	37.3	130.4
Lion	923	23.3	29.0	30.8				3	27.7	96.9
Semibarbless	2809	21.7	21.3	16.3				3	19.8	69.2
Arlington Awnless	702	18.4	11.3	14.5				3	14.7	51.4
Arizona	2808	30.1	20.7	25.9				3	25.6	89.5
Gold	1145		38.1	33.3				2	35.7	128.9
Charlottetown 80	2732		10.1	28.8				2	19.5	70.4
Oderbrucker	1273		33.4	29.1				2	31.3	113.0
Gold	1145				38.0	38.5	29.9	3	35.5	107.6
Do	1145				31.0	38.2	33.8	3	34.3	103.9
Do	1145				27.3	38.1	29.9	3	31.8	96.4
Crawford	2810				27.9	38.9	32.4	3	33.1	100.3
Do	3136				34.3	38.7	31.8	3	34.9	105.8
Do	3137				29.4	37.5	41.3	3	36.1	109.4
Do	3138				39.0	37.9	40.9	3	39.3	119.1
Do	3139				35.2	36.7	33.5	3	35.1	106.4
Charlottetown 80	2732				27.6	37.3	36.1	3	33.7	102.1
Oderbrucker	1273				27.3	38.3	32.4	3	32.7	99.1
Do	1273				31.5	30.9	32.5	3	31.6	95.8
Do	1273				31.8	32.1	33.0	3	32.3	97.9
Do	1273				25.3	30.7	36.1	3	30.7	93.0
Do	1273				28.9	34.7	31.1	3	31.6	95.8
Manchuria	3140				27.6	30.8	29.7	3	29.4	89.1
Do	3141				37.3	34.0	30.8	3	34.0	103.0
Do	3142				30.2	34.2	28.3	3	30.9	93.6
Do	3143				24.9	29.9	28.0	3	27.6	83.6

TABLE 24.—*Annual acre yields of varieties of barley grown at the Indiana Agricultural Experiment Station (at La Fayette) in some or all of the 17 years from 1905 to 1921, inclusive*

[Data obtained through the courtesy of the Indiana Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																	Years grown	Average yield (bus.)	Percentage of weighted mean
		1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Success Beardless	1808	20.6	21.7	16.2	21.3	30.5	45.7	20.9	37.8	7.3	6.4	20.5	28.7	48.8	42.5	17.5	16.2	25.0	17	25.1	104.1
Hanna	203	19.6	24.8	8.4	17.7	33.1													5	20.7	89.2
Silver Beardless	641	17.5	24.0	11.8	14.4	32.7													5	20.1	86.6
Silver King	890	22.3	33.6	21.2	19.0	46.3													5	28.5	122.8
Manchuria	241	20.4	30.3	10.0	13.4	47.1													5	24.2	104.3
Highland Chief	883	20.0	20.9	9.0	16.3	37.6													5	20.8	89.7
Black Hull-less	596	16.8	18.6	15.0	14.4	31.3													5	19.2	82.8
Nepal	595	16.4		9.3	13.2	35.4													4	18.6	80.9
Great Beardless	2779	20.6	23.6	17.3	15.7	32.2													5	21.9	94.4
Oderbrucker	2780				21.1	41.3	42.0	18.6	37.5	9.0	3.2								7	24.7	118.2
Manchuria	244				19.7	43.7	43.2	16.3	34.4	5.2	5.2								7	24.0	114.8
O. A. C. 21	1470				18.8	48.0	41.8	19.9	55.0	7.1	5.9								7	28.1	134.4
Garton 986	645					31.3	32.3	.1	4.6	2.7	4.9								6	12.7	58.8
Reed Triumph	889						32.3	5.1	38.4	5.8	6.2	14.2	29.2	65.6					8	24.6	103.8
Sexradigt	607							17.6	46.2	8.7	6.3	18.1	33.9	51.8					7	26.1	116.0
Hannchen	531							17.8	55.5	8.7	8.1	17.9	35.2	50.5					7	27.7	123.1
Primus	532							3.8			0	12.8	23.4	45.7					5	17.1	76.3
Princess	529							4.9	56.1	3.7	6.3	24.8	33.6	44.9					7	24.9	110.7
Chevalier II	200							9.1	42.0	5.4	2.7	15.7	25.3	38.8					7	19.9	88.4
Stoeckinger	2781									8.1	5.1	16.0	31.3	38.3					5	19.8	93.0
Svanhals	187										1.9	16.8	30.7	45.8					4	23.8	96.0
Gold	1145										2.3	16.0	32.7	48.8					4	24.9	100.4
Wing Pedigree	1177													46.3	42.7	24.3	13.4	23.3	5	30.0	92.0
Horsford	1271													45.8	32.5	20.1	15.0	21.0	5	26.9	82.5
Charlottetown 80	2732													53.3	45.5	14.6	22.6	22.1	5	31.6	96.9
Wisconsin Pedigree	835														38.0	18.6	21.0	28.7	4	26.6	101.1
Manchuria	2330															21.4	25.7	32.2	3	26.4	110.9
Lion	923																26.7	32.2	2	29.5	118.0
Michigan	2782																29.2	21.9	2	25.5	102.0
Oderbrucker	1529																24.1	33.2	2	28.7	114.8
Gatami	575																13.3	32.5	2	22.9	91.6
Featherston	1120																	46.2	1	46.2	159.9

LA FAYETTE, IND.

The annual yields of the barley varieties grown at Purdue University, La Fayette, Ind., were furnished through the courtesy of the Indiana Agricultural Experiment Station. These yields, which extend over a period of 17 years, are reported in Table 24. Success Beardless (C. I. No. 1808) was the only variety carried in the test for the entire period. Its yield was 104 per cent of that of the weighted mean of all varieties. Owing to the fact that many varieties were discarded after the harvests in 1909, 1914, and 1917, it is easier to discuss their relative value by periods. In the years 1905 to 1909, inclusive, Silver King (C. I. No. 890) and Manchuria (C. I. No. 241) were the best of the nine varieties grown. From 1908 until 1914 only three varieties, all of which were fully comparable, belong to the Manchuria group. Of these, O. A. C. 21 (C. I. No. 1470) was the best. Hannchen (C. I. No. 531) produced the highest yield of the nine varieties discarded after 1917. Unfortunately there were no barleys of the Manchuria group in the test for the years 1915, 1916, and 1917. Hannchen was in the test for four of the years in which O. A. C. 21 was grown and was better than O. A. C. 21 in three of these years. The difference in yield, however, was very small.

Hannchen was not grown in 1919, 1920, and 1921, when varieties of the Manchuria group were included in the experiment. During the years 1917 to 1921, inclusive, 10 barleys were tested one or more years. Charlottetown 80 (C. I. No. 2732) was the most promising of those grown for the full five years. Manchuria (C. I. No. 2330), a selection made at the Minnesota Agricultural Experiment Station, was the best of the five varieties that were carried for three years. Lion (C. I. No. 923), introduced in 1920, gave relatively high yields for two years, while Featherston (C. I. No. 1120) was by far the best variety in 1921, the only year in which it was grown. These results indicate that the Manchuria barleys are the ones best adapted to this section of Indiana. This agrees with the results in the neighboring States and with what is known of the ecological adaptation of varieties. The Manchuria barleys are adapted to climates where the ripening season is warm and humid without excessive heat. Barleys of the Hanna and Chevalier groups grow best in cooler regions. That the Charlottetown 80 has done well not only at La Fayette but at many other points in the Mississippi Valley is proof that this selection differs materially from the original Chevalier of England. Primus (C. I. No. 532), a barley of the Thorpe type, was very low in productivity. This variety must have a cool ripening season before good yields are secured. It is of especial interest that high yields were obtained from Success Beardless (C. I. No. 1808), a barley of the Horsford group. It was the only variety carried for the entire 17 years. In each of the four periods it was one of the better sorts.

TABLE 25.—*Annual acre yields of varieties of barley grown at the Illinois Agricultural Experiment Station (at Urbana) in part or all of the seven years from 1915 to 1921, inclusive*

[Data obtained through the courtesy of the Illinois Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1915	1916	1917	1918	1919	1920	1921			
Oderbrucker	836	53.3	57.1	72.7	43.8	34.2	31.8	48.9	7	48.8	122.6
Horsford	507	44.6	43.7	46.7	39.0	26.9	30.1	------	6	38.5	99.0
Nepal	595	17.7	26.8	24.4	14.4	------	------	------	4	20.8	50.6
Montana	3118	------	28.0	39.7	13.8	------	------	------	3	27.2	65.4
Wisconsin Pedigree	835	------	55.4	71.7	46.2	36.3	35.4	53.0	6	49.7	124.6
Lion	923	------	------	------	------	------	------	39.0	1	39.0	83.0

URBANA, ILL.

The Illinois Agricultural Experiment Station at Urbana furnished data as to the yields of the barley varieties tested there for the seven years from 1915 to 1921, inclusive. These are reported in Table 25. Six varieties were tested during this period. Of these, Oderbrucker (C. I. No. 836) was in the test for the full seven years. Unfortunately few types of barley were included. The only 2-rowed barley was Montana (C. I. No. 3118), which was probably a Chevalier. The Chevalier barleys, perhaps, are the least suited of the 2-rowed forms for Illinois conditions, except possibly those of the Thorpe group. Of all the varieties in the test those of the Manchuria group were by far the best. Oderbrucker (C. I. No. 836) and Wisconsin Pedigree (C. I. No. 835) were the only two varieties which yielded more than the weighted mean of all varieties for the years grown. Wisconsin Pedigree was somewhat better than Oderbrucker. Horsford (C. I. No. 507) gave a higher relative yield than at most places. With the exception of the two Oderbrucker strains, however, the competing varieties were not well adapted.

DE KALB, ILL.

The reports of yields at De Kalb, Ill., shown in Table 26 were furnished through the courtesy of the Illinois Agricultural Experiment Station. Varieties were grown at this point during the same period as at Urbana. Eight varieties were tested at De Kalb. As was the case at Urbana, barleys of the Manchuria group were markedly superior. In three of the five years in which both varieties were grown at De Kalb Oderbrucker (C. I. No. 836) was better than Wisconsin Pedigree (C. I. No. 835). Lion (C. I. No. 923) gave very good yields for the two years grown. This is a black, 6-rowed, smooth-awned variety distributed by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul. The strain grown in Illinois was from a plant selection made by the Michigan Agricultural Experiment Station from Lion (C. I. No. 923). It was sent out by the Michigan station as Black Barbless. The Lion sent to Michigan apparently had become accidently mixed or hybridized in Minnesota. The plant selection made in Michigan seems identical with the Lion selection made in Minnesota; at least it differs so little from the original variety that, for the purpose of this description, it is carried under the original name. The Montana barley (C. I. No. 3118) produced higher yields at De Kalb than at Urbana. Its yields were as high as those of Wisconsin Pedigree in 1915 only. In the three following years it was much inferior.

From the results at Urbana and De Kalb it is apparent that northern Illinois is definitely in the district where barleys of the Manchuria type are especially adapted. This agrees with the results in the neighboring States, with the exception of parts of Michigan. In Ohio, Indiana, Illinois, and Wisconsin the barleys of the Manchuria type unquestionably are superior as far as the varieties now known have been compared. Hooded barleys of the Horsford type have given fair yields but are undoubtedly inferior to the Manchuria and Oderbrucker barleys in yielding capacity. Lion has shown some promise in Illinois and in neighboring States. Hybrids of this variety with varieties of the Manchuria group have been made at the Minnesota, Wisconsin, and other stations, and it is possible that smooth-awned barleys which are white in color may prove valuable in this section.

TABLE 26.—*Annual acre yields of varieties of barley grown at the Soil Experiment Field, De Kalb, Ill., in part or all of the seven years from 1915 to 1921, inclusive*

[Data obtained through the courtesy of the Illinois Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1915	1916	1917	1918	1919	1920	1921			
Michigan	2782	24.9							1	24.9	70.5
Montana	3118	50.0	34.6	32.9	30.3				4	36.9	86.0
Nepal	595	21.4	28.2	12.5	32.9				4	23.7	55.2
Wisconsin Pedigree	835	44.7	47.2	61.6	77.1	27.2	51.3	37.2	7	49.5	118.7
Horsford	507			42.0	52.0	23.5	47.8		4	41.3	91.2
Oderbrucker	836			63.8	73.3	34.3	51.8	36.0	5	51.8	118.8
Lion	923						55.7	36.7	2	46.2	104.8
Silver King	890							36.7	1	36.7	100.0

MADISON, WIS.

Wisconsin is one of the more important barley-producing States of the United States. The testing of varieties at the Wisconsin Agricultural Experiment Station was begun at an early date. The yields shown in Table 27 were furnished through the courtesy of this station, in whose reports some of the earlier yields were published. An organization of farmers interested in the testing and growing of good barley in Wisconsin assisted in establishing farm culture of pedigreed varieties in the State, and this acted as an incentive to experiment-station workers to produce better varieties. Not only has very important work been done here, but the Wisconsin station has been a distributing center of varieties, especially those of the Manchuria group. Many of these have been sent out under the names of Oderbrucker, Wisconsin Pedigree, and Silver King. In the earlier years of the station a Manchuria barley was widely distributed, often under the spelling "Manshury." This has been changed to Manchuria, principally to make it conform with varieties which have been widely tested at other stations and which also came from Manchuria. The history of this variety is given under C. I. No. 241 in a special paragraph elsewhere in this bulletin.

Six groups of barley were compared, of which the Manchuria group was outstanding. The Hanna group, which was next in point of yield, was much inferior to the Manchuria. The Thorpe, Chevalier, Horsford, and Hybrid groups follow in the order named.

It will be seen in the summarized digest of Table 27, in which eight varieties are compared, that barleys of the Manchuria group are as outstanding in their performance as was the group itself. The best variety of the eight compared was Oderbrucker (C. I. No. 2700), though Manchuria (C. I. No. 241) was practically equal in point of yield. The best of the other types compared was Svanhals (C. I. No. 187). Its yield was only 81 per cent of that of Oderbrucker. Hannchen (C. I. No. 531), which usually gives good yields where barleys of the Hanna type are adapted, yielded only 61 per cent of that of Oderbrucker during the five years in which both were in the test.

It is obvious that among so many varieties it is impossible to compare in detail all of the important ones. In recent years several varieties have been tested which have shown promise elsewhere. Charlottetown 80 (C. I. No. 2732) was grown in the years 1917, 1918, and 1920. For these years its average yield was 50.6 bushels, which was 102 per cent of the weighted mean of all varieties. Manchurian (C. I. No. 739) was grown in 1907 and in the seven years from 1915 to 1921, inclusive. Its yield was 115 per cent of the weighted mean. Gold (C. I. No. 1145) was grown in the six years from 1915 to 1920, inclusive. Its yield was 91 per cent of the weighted mean. For the seven years from 1914 to 1920, inclusive, O. A. C. 21 produced an average yield of 49.2 bushels, which was 107 per cent of the weighted mean. Of the varieties introduced into the test since 1912 O. A. C. 21 (C. I. No. 1470) seems to be especially promising, while Charlottetown 80 deserves consideration when it is compared with 2-rowed barleys.

The results at Madison show that barleys of the Manchuria-Oderbrucker type are especially suited to growing in Wisconsin. Although varieties of other types have been tested as extensively, they have not given sufficient promise to justify carrying many of them. Several varieties from the Wisconsin station, such as Wisconsin Pedigree (C. I. No. 835), Oderbrucker (C. I. No. 836), and Silver King (C. I. No. 890), have been widely tested over the United States and at many stations have given very high yields. These varieties are discussed elsewhere.

TABLE 27.—*Annual acre yields of varieties of barley grown at the Wisconsin Agricultural Experiment Station (at Madison) in one or more of the years from 1871 to 1921, inclusive*

[Data obtained through the courtesy of the Wisconsin Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																				
		1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1886	1887	1888	1889	1899	1900	1901	1902	1903	1904	1905
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Chevalier	2802	43.5	16.4	------	10.2	------	9.2	44.3	58.1	33.5	------	23.1	23.0	23.2	44.0	------	------	------	------	------	------	------
Saxonian	2803	45.9	22.2	26.5	26.5	45.0	19.6	52.5	43.6	37.3	------	------	------	------	------	------	------	------	------	------	------	------
Probstier	122	51.4	23.2	------	------	------	------	57.6	41.4	37.4	59.0	------	------	------	------	------	------	------	------	------	------	------
Manchuria	241	------	32.7	48.0	20.3	60.0	49.6	65.0	66.8	52.2	83.2	33.1	43.0	53.5	73.4	49.4	57.7	37.9	71.0	53.5	------	49.5
Scotch	848	------	20.6	34.4	13.4	44.0	29.6	54.7	54.8	44.5	66.9	------	------	34.3	70.1	------	------	------	------	------	------	------
Champion of Vermont	1892	------	------	------	------	------	------	------	------	------	------	33.3	34.0	46.8	66.8	------	------	------	------	------	------	------
Sibley Imperial	2805	------	------	------	------	------	------	------	------	------	------	30.1	32.5	32.9	------	------	------	------	------	------	------	------
Nepal	595	------	------	------	------	------	------	------	------	------	------	19.1	37.0	34.0	55.3	------	61.8	19.0	34.8	------	------	20.0
Golden Melon	411	------	------	------	------	------	------	------	------	------	------	42.5	25.0	22.3	------	------	------	------	------	------	------	------
Black	256	------	------	------	------	------	------	------	------	------	------	------	------	23.3	50.6	------	------	------	------	------	------	------
Highland Chief	209	------	------	------	------	------	------	------	------	------	------	------	------	29.6	48.7	------	------	------	------	------	------	------
Oderbrucker	2700	------	------	------	------	------	------	------	------	------	------	------	------	------	------	56.2	56.4	43.7	45.6	47.8	48.0	58.0
Sisolsk	89	------	------	------	------	------	------	------	------	------	------	------	------	------	------	31.1	38.0	------	------	------	------	------
Kulu	2694	------	------	------	------	------	------	------	------	------	------	------	------	------	------	35.0	47.1	24.1	------	------	------	------
Silver King	890	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	61.0	42.2	45.4	45.6	34.0	47.0
Salzer Beardless	642	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	50.7	39.2	17.5	------	------	------
French Chevalier	175	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	49.0	23.3	------	------	------	------
Golden Queen	558	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	58.6	33.3	66.3	55.8	35.0	51.2
Bernard	881	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	66.7	------	------	------	------	------
Manchuria	244	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	38.3	45.6	------	52.0	------
Altamura	91	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	28.3	40.0	45.0	------	------
Svanhals	187	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	48.3	48.5	41.6	36.0	45.4
Princess	529	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	37.1	44.8	32.4	38.0	40.3
Hanna	203	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	45.2	47.5	47.5	36.0	------
Chevalier II	200	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	35.0	34.1
Hannchen	531	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	39.0	36.6
Primus	532	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	48.0	28.3
Beldi Dwarf	190	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	24.0	------
Evans	892	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	22.6
Black Hull-less	596	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	20.0
Hungarian Hull-less	2806	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	23.3
Himalaya	620	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	34.0
Frankish	282	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	30.8
Tennessee Winter	257	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	37.3

Variety	C. I. No.	Acre yields (bushels)																Years grown	Average yield (bus.)	Percentage of weighted mean
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
1	2	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Chevalier	2802																	11	29.9	78.1
Saxonian	2803																	9	35.5	91.5
Probstier	122																	6	45.0	96.8
Manchuria	241	60.6	20.4	50.0														22	51.4	146.4
Scotch	848		26.3															12	41.1	122.7
Champion of Vermont	1892																	4	45.2	116.8
Sibley Imperial	2805																	3	31.8	98.8
Nepal	595																	8	35.1	86.2
Golden Melon	411																	3	29.9	92.9
Black	256																	2	36.9	83.3
Highland Chief	209																	2	39.1	88.3
Oderbrucker	2700	60.1	32.7	58.7														10	50.7	151.3
Sisolsk	89																	2	34.5	67.3
Kulu	2694																	3	35.4	81.0
Silver King	890	61.3	29.5	29.3														9	43.9	132.2
Salzer Beardless	642																	3	35.8	80.4
French Chevalier	175																	2	36.1	82.4
Golden Queen	558	44.4	32.0	33.3														9	45.5	137.0
Bernard	881																	1	66.7	121.9
Manchuria	244	10.3																4	36.5	110.6
Altamura	91																	3	37.8	90.4
Svanhals	187	58.3	17.1	23.5					31.5	35.0	54.3	32.7	35.6	62.9	21.7	30.2		16	38.9	106.9
Princess	529	22.9	6.1	23.7														8	30.7	96.8
Hanna	203	23.9		53.3	27.5													7	40.1	114.9
Chevalier II	200	27.2	9.6															4	26.5	98.9
Hannchen	531	18.6	28.7	34.6														5	31.5	109.0
Primus	532	25.0	6.6	45.4														5	30.7	106.2
Beldi Dwarf	190	17.8	20.5															3	20.8	84.2
Evans	892	18.1																2	20.3	69.8
Black Hull-less	596	16.6																2	18.3	62.9
Hungarian Hull-less	2806	7.7																2	15.5	53.3
Himalaya	620	27.5																2	30.7	105.5
Frankish	282	33.8	10.8	32.0														4	26.9	96.8
Tennessee Winter	257																	1	37.3	103.3
Norwegian	2748	17.6		24.6														2	21.1	69.9
White Smyrna	195	21.9	20.8															2	21.3	95.9
Black Smyrna	191	18.7																1	18.7	73.3
Horsford	507	23.7																1	23.7	92.9
Nepal	533	6.6																1	6.6	25.9
Albacete	199	13.5																1	13.5	52.9
Club Mariout	261	21.8																1	21.8	85.5

TABLE 27.—*Annual acre yields of varieties of barley grown at the Wisconsin Agricultural Experiment Station (at Madison) in one or more of the years from 1871 to 1921, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																Years grown	Average yield (bus.)	Percentage of weighted mean
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
1	2	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Garton	263	13.0																1	13.0	51.0
Do	264	10.8																1	10.8	42.4
Do	266	16.1	3.7	26.2														3	15.3	58.4
Odessa	182	19.4	10.8	38.9														3	23.0	87.8
Royal	1252	19.0	14.1	31.2														3	21.4	81.7
Claude	1557	17.2																1	17.2	67.5
Mensury	2657	35.7	27.5	36.2														3	33.1	126.3
Sexradigt	607		13.7															1	13.7	72.5
Gutekorn	606		12.5	57.0														2	34.7	130.5
Gottland	2749		14.7															1	14.7	77.8
Manchurian	739		26.5								66.7	43.5	45.6	60.6	25.4	46.2	24.1	8	42.3	115.3
Hanna	319		8.9															1	8.9	47.1
Canadian Lake Shore	2750		29.2															1	29.2	154.5
Coast	690		26.5															1	26.5	140.2
Standwell	584		19.5															1	19.5	103.2
Mansfield	2241		20.0															1	20.0	105.8
Invincible	590		8.3															1	8.3	43.9
Sidney	178		20.0															1	20.0	105.8
Chevalier	156		7.9															1	7.9	41.8
Garton 936	2752		42.9		22.9													2	32.9	137.1
Manchuria	1275			42.5	40.4	54.1	35.4	52.0		39.3	59.3	42.8	53.5	60.0	23.5	48.7	26.0	13	44.4	107.5
Oderbrucker	1274			38.6	46.7	40.8	41.2	41.2			48.3							6	42.8	103.1
Do	1273			31.1	40.8	29.5	34.7	45.0										5	36.2	92.3
Silver King	1276			37.6		32.0	35.4	49.1										4	38.5	96.3
Do	905			34.0	37.5	35.8	35.4	49.5		43.0	62.3	36.3	47.5	65.0				10	44.6	103.5
Oderbrucker	1529			35.3	37.5	45.0	35.4	47.0		38.4	58.3	38.3	47.1	65.4	28.3	47.9	30.5	13	42.6	103.1
Golden Queen	2753			27.2	17.9	42.5	35.4	50.8										5	34.8	88.8
Silver King	2754			26.8	32.1	44.4	40.8	47.9										5	38.4	98.0
Oderbrucker	1272				45.0	42.5	41.6	44.1			50.4	38.8	50.4	57.3	23.7	50.2	30.1	11	43.1	102.1
Manchuria	2756				45.8	43.5	40.0	46.6			61.7	39.7						6	46.2	108.5
Golden Queen	1511				29.4													1	29.4	84.2
Manchuria	2758				33.3	42.5	41.6	49.1										4	41.6	103.5
Do	2760				31.3	35.4	45.8	51.2										4	40.9	101.7
Do	2762					45.0	35.4	48.3			58.0	42.7	53.7	55.3			26.5	8	45.6	102.7
Wisconsin Pedigree 20	2761					31.2	45.8	43.7										3	40.2	96.2
Manchuria	2764					50.0	31.6	18.7										3	33.4	79.9

Wisconsin Pedigree 18	2763					47.9	35.6	48.3			59.3							4	47.8	106.5
Wisconsin Pedigree 17	2765							41.6			66.0	39.6					26.6	4	43.5	100.2
O. A. C. 21	1470									44.5	58.1	42.1	48.4	63.1	43.9	44.6		7	49.2	107.4
Gold	1145										40.3	32.8	52.5	72.9	23.9	30.8		6	42.2	91.1
Wisconsin Pedigree 35	2766										61.4	41.1						2	51.3	106.7
Arlington Awnless	702										24.1							1	24.1	43.7
Charlottetown 80	2732												57.5	50.0		44.4		3	50.6	102.4
Wing Pedigree	1177												33.3	38.9	30.6	31.8	21.6	5	31.2	75.4
Success	2807															29.2		1	29.2	72.3
Korsbyg	918																21.2	1	21.2	84.1
Reed Triumph	889																20.2	1	20.2	80.2

Summarized Digest, Showing the Relative Performance of Eight Representative Varieties

Variety	C. I. No.	Data shown	Varieties and percentages							
			Chevalier II	Primus	Svanhals	Hanna	Hannchen	Oderbrucker	Manchuria	Nepal
Chevalier II	200	Years comparable		4	4	2	4	4	3	1
		Percentage yield		98.1	67.5	103.8	86.2	53.3	54.3	170.5
Primus	532	Years comparable	4		5	3	5	5	4	1
		Percentage yield	101.9		85.0	104.6	97.3	59.5	58.3	141.5
Svanhals	187	Years comparable	4	5		6	5	8	7	3
		Percentage yield	148.1	117.6		101.1	114.5	80.8	82.4	192.7
Hanna	203	Years comparable	2	3	6		3	6	5	2
		Percentage yield	96.3	95.6	98.9		122.8	83.4	79.6	172.3
Hannchen	531	Years comparable	4	5	5	3		5	4	1
		Percentage yield	116.1	102.7	87.4	81.4		61.2	65.7	183.0
Oderbrucker	2700	Years comparable	4	5	8	6	5		9	4
		Percentage yield	187.7	168.0	123.8	119.9	163.5		102.0	150.2
Manchuria	241	Years comparable	3	4	7	5	4	9		8
		Percentage yield	184.1	171.4	121.3	125.6	152.3	98.0		149.1
Nepal	595	Years comparable	1	1	3	2	1	4	8	
		Percentage yield	58.7	70.7	51.9	58.0	54.6	66.6	67.0	

TABLE 28.—*Annual acre yields of varieties of barley grown at the Minnesota Agricultural Experiment Station (at St. Paul) in one or more of the 29 years from 1893 to 1921, inclusive*

[Data obtained through the courtesy of the Minnesota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																													Years grown	Average yield (bus.)	Percentage of weighted mean
		1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Black Hull-less	596	24.1	----	51.5	38.1	35.0	----	----	----	----	----	----	----	----	----	----	----	35.8	28.7	27.5	----	53.2	26.9	52.1	----	----	----	----	----	----	10	37.3	82.2
Horsford	507	25.0	----	42.7	50.7	39.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	43.5	41.8	61.9	----	----	----	----	----	----	7	43.6	82.7
Bernard	881	22.8	----	45.4	53.3	45.0	----	61.2	51.3	49.6	39.9	33.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	9	44.7	104.9
Highland Chief	883	18.4	----	50.0	56.3	----	----	----	----	----	----	----	36.6	46.6	38.9	20.0	33.1	----	----	----	----	----	----	----	----	----	----	----	----	----	8	37.5	92.1
Oderbrucker	2700	----	17.3	43.3	----	50.9	66.6	46.6	48.3	44.8	32.7	42.3	----	----	----	----	40.6	40.4	26.2	38.9	----	68.5	58.2	72.8	----	----	----	----	----	----	16	46.1	107.2
Manchuria	244	----	11.3	----	----	49.5	66.8	64.6	52.7	60.0	53.5	43.4	43.5	52.7	37.7	43.5	34.4	47.4	29.0	43.4	33.6	67.4	59.8	71.2	30.7	32.8	53.9	----	----	----	23	47.1	112.1
French Chevalier	175	----	1.8	57.9	53.3	32.1	----	51.2	44.2	32.1	33.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	8	38.3	91.6
Cheyney	326	----	4.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	4.6	56.1
Thanet	2652	----	6.9	46.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	26.5	71.0
Scotch	848	----	17.7	----	----	56.0	----	50.0	52.5	47.5	41.0	37.1	----	----	----	----	32.5	----	----	----	----	----	----	----	----	----	----	----	----	----	8	41.8	107.7
Empress	2824	----	1.8	----	----	19.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	2	10.5	30.6
Golden Drop	2135	----	3.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	3.0	36.6
Common	184	----	9.2	----	----	57.7	----	53.7	57.5	51.7	42.5	43.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	7	45.0	114.8
Royal	1252	----	----	55.7	41.3	38.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	45.3	97.0
Surprise	171	----	----	51.5	45.8	35.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	44.2	94.6
Summit	174	----	----	52.4	48.3	34.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	45.1	96.6
Victor	179	----	----	34.9	44.6	38.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	39.3	84.2
Trooper	173	----	----	60.7	53.7	42.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	52.2	111.8
Manchuria	241	----	----	47.9	50.6	54.6	----	46.6	45.8	55.4	42.8	46.3	39.7	52.3	34.3	40.0	----	----	26.6	36.7	----	69.3	----	----	----	----	----	----	----	----	15	45.9	108.0
Mensury	170	----	----	53.7	56.7	55.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	55.3	118.4
Champion of Vermont	1892	----	----	49.8	61.7	39.8	51.6	49.1	43.3	38.0	34.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	8	45.9	103.6
New Zealand	2656	----	----	43.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	43.9	93.2
Prize Prolific	169	----	----	40.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	40.8	86.6
Sibley Imperial	2805	----	----	39.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	39.4	83.7
Chevalier	2802	----	----	52.3	45.0	45.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	3	47.7	102.1
Kinver Chevalier	587	----	----	44.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	44.4	13.8	----	----	----	----	----	----	----	3	34.3	66.1
Danish Chevalier	180	----	----	39.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	39.2	83.2
Petschora	2658	----	----	44.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	44.6	94.7
Goldthorpe	327	----	----	34.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	34.1	72.4
Odessa	182	----	----	62.5	50.4	45.8	----	60.0	51.3	45.4	40.0	46.0	----	----	----	----	----	38.3	30.4	38.3	----	59.6	----	----	----	----	----	----	----	----	12	47.3	110.8
Sharpe Chevalier	2650	----	----	42.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	42.7	90.7
Golden Grain	588	----	----	44.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	44.8	95.1
Canadian Thorpe	740	----	----	38.3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	38.3	81.3
Culver	2825	----	----	----	----	49.4	----	36.2	58.7	25.4	23.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	38.6	91.5
Golden Queen	558	----	----	----	----	51.7	----	67.0	53.7	51.7	58.6	51.1	43.0	43.7	35.4	40.0	48.3	41.7	24.7	43.7	----	66.7	48.7	----	----	----	----	----	----	----	16	48.1	116.5
Baxter	185	----	----	----	----	56.3	----	60.4	42.5	44.2	30.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	46.8	110.9

Coast	690					38.5		53.3	52.5	32.5	33.7												45.8	56.5							7	44.7	95.1
South African	2826					46.7		43.7	64.6	25.0	16.1																				5	39.2	92.9
Sisolsk	89							27.5	42.5	45.4	40.4	40.6																			5	39.3	96.6
Standwell	584									29.2	18.9																				2	24.1	66.9
Invincible	590									23.3	14.4																				2	18.9	52.5
Kitzing	189									35.4	30.8	39.0																			3	35.1	96.2
Do	201									33.8	34.2	46.3																			3	38.1	104.4
Frankish	207									32.1	28.8	37.1																			3	32.7	89.6
Pilsen	186									32.5	27.7	38.3																			3	32.8	89.9
Hanna	203									40.0	34.2	33.0																			3	35.7	97.8
Svanhals	187									36.6	21.8	23.8					30.0	46.7	27.2		38.3	63.4	37.8								9	36.2	89.2
Princess	529									29.6	22.5	27.9	49.1	48.3	33.5		31.7	29.6	25.4		5.0	25.7	8.0						29.2	22.2	14	27.7	69.6
Chevalier II	200									32.5	29.5	23.7	37.0	45.8	29.2		37.1	32.5													8	33.4	86.5
Duckbill Bald	2828											33.9	38.7	56.2	30.0		26.4	51.7	23.7		34.2	72.5	32.1	76.7	22.1						12	41.5	97.4
Brush	2829											29.1	37.0	45.4																	3	37.2	94.7
Ross	2830											42.3	32.0	62.5	47.9	40.4															5	45.0	112.5
Manchuria	2831											50.3	37.0	60.0	41.6	38.7	46.9	35.0	22.2	44.6											9	41.8	111.5
Crop Nursery	2832											23.3	34.7	55.4	40.8	32.0	31.3														6	36.3	92.1
Hybrid	2834											32.0	33.5	42.9	30.8																4	34.8	87.0
Do	2833												34.1	45.0	32.5																3	37.2	92.1
Manchuria	2835												41.4	55.0	45.8	35.4															4	44.4	109.9
Do	2836												41.4	54.5	45.8	41.6															4	45.8	113.4
Do	2837												32.5	51.6	41.6	41.6															4	41.8	103.5
Hybrid	2838												34.5	51.2	31.2		33.5	49.2	29.3		34.2	55.3	50.4	68.3							10	43.7	101.6
Do	2839												17.9	34.1	23.7																3	25.2	62.4
Do	2840												25.1	33.7	22.7																3	27.2	67.3
Do	2841												22.3	32.9	34.5																3	29.9	74.0
Do	2842												38.0	42.0	40.4																3	40.1	99.3
Do	2843												30.4	32.9	34.1		41.6														4	34.7	87.8
Do	2844												20.4	31.6	33.5		26.8														4	28.1	71.1
Do	2845												25.0	38.7	30.2																3	31.3	77.5
Do	2846												31.1	42.9	34.1		26.6	46.7	20.8	30.8		49.6									8	35.3	85.9
Do	2847												26.0	39.2	33.5																3	32.9	81.4
Hanna	319												37.1	45.8	36.5		34.3	45.5	28.7		48.3	57.5	34.9								9	41.0	99.5
Hannchen	531												29.2	51.2	29.2		29.4	38.3	29.3		38.3	35.6	49.3								9	36.6	88.8
Primus	532												25.4	40.0	25.0		23.3	31.7	22.0		38.3	51.8	14.9								9	30.3	73.5
Blue Ribbon	611													50.0	41.2	37.5	38.6		29.3	37.1		59.6	52.7	71.2							9	46.4	105.5
Manchuria	2827														44.2	41.6	43.9														3	43.2	109.4
Do	2848														45.0	43.7	47.0														3	45.2	114.4
Do	2849														45.8	44.1	45.8														3	45.2	114.4
Do	2850														49.2	45.8	45.2														3	46.7	118.2
Do	2851														43.0	47.1	44.5														3	44.9	113.7
Do	2852														42.9	47.1	41.6														3	43.9	111.1
Do	2853														42.5	40.0															2	41.3	101.5
Do	2854														50.0	39.5	43.8					65.6									4	49.7	109.2
Do	2855														50.0	46.2	45.8														3	47.3	119.7
Do	2856														44.2	45.8	45.8														3	45.3	114.7
Do	2857														49.2		43.5														2	46.3	117.8
Do	2858														59.6		46.2														2	52.9	134.6
Do	2861														59.2	29.2															2	44.2	108.6
Do	2863														55.8		50.0	40.8	34.5	42.9											5	44.8	122.1
Do	2865														60.0		44.1														2	52.1	132.6

TABLE 28.—*Annual acre yields of varieties of barley grown at the Minnesota Agricultural Experiment Station (at St. Paul) in one or more of the 29 years from 1893 to 1921, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																													Years grown	Average yield (bus.)	Percentage of weighted mean
		1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Manchuria	2867	----	----	----	----	----	----	----	----	----	----	----	----	----	51.7	----	40.8	----	----	----	----	----	----	----	----	----	----	----	----	----	2	46.3	117.8
Do	2866	----	----	----	----	----	----	----	----	----	----	----	----	----	48.8	44.2	38.3	----	----	----	----	----	----	----	----	----	----	----	----	----	3	43.8	110.9
Do	2868	----	----	----	----	----	----	----	----	----	----	----	----	----	50.8	43.7	42.7	----	----	----	----	----	----	----	----	----	----	----	----	----	3	45.7	115.7
Do	2869	----	----	----	----	----	----	----	----	----	----	----	----	----	47.9	39.5	37.7	----	----	----	----	----	----	----	----	----	----	----	----	----	3	41.7	105.6
Do	2870	----	----	----	----	----	----	----	----	----	----	----	----	----	49.2	41.6	40.4	----	----	----	----	----	----	----	----	----	----	----	----	----	3	43.7	110.6
Do	2330	----	----	----	----	----	----	----	----	----	----	----	----	----	50.0	----	48.3	42.5	46.2	54.2	----	79.6	57.8	53.2	35.4	43.9	52.9	35.6	27.9	26.9	14	46.7	110.9
Do	2871	----	----	----	----	----	----	----	----	----	----	----	----	----	53.0	----	43.9	----	----	----	----	----	----	----	----	----	----	----	----	----	2	48.5	123.4
Do	2872	----	----	----	----	----	----	----	----	----	----	----	----	----	47.0	----	42.5	----	----	----	----	----	----	----	----	----	----	----	----	----	2	44.7	113.7
Do	2873	----	----	----	----	----	----	----	----	----	----	----	----	----	45.0	----	39.3	----	----	----	----	----	----	----	----	----	----	----	----	----	2	42.1	107.1
Do	2874	----	----	----	----	----	----	----	----	----	----	----	----	----	37.5	----	44.3	----	----	----	----	----	----	----	----	----	----	----	----	----	2	40.9	104.1
Hybrid	2875	----	----	----	----	----	----	----	----	----	----	----	----	----	37.9	----	34.7	26.7	----	----	----	----	----	----	----	----	----	----	----	----	3	33.1	84.7
Do	2876	----	----	----	----	----	----	----	----	----	----	----	----	----	33.8	----	34.1	----	----	----	----	----	----	----	----	----	----	----	----	----	2	33.9	86.3
Chevalier	2877	----	----	----	----	----	----	----	----	----	----	----	----	----	26.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	26.7	65.3
Frankish Brewing	2878	----	----	----	----	----	----	----	----	----	----	----	----	----	37.9	----	40.6	38.3	----	----	----	----	----	----	----	----	----	----	----	----	3	38.9	99.5
Manchuria	2879	----	----	----	----	----	----	----	----	----	----	----	----	----	----	36.2	43.3	----	----	----	----	----	----	----	----	----	----	----	----	----	2	39.7	102.6
Himalaya	620	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	15.4	----	----	----	----	----	----	----	----	----	----	----	----	----	1	15.4	40.3
Gutekorn	606	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.8	40.8	17.9	----	37.9	55.9	27.5	----	----	----	----	----	----	----	6	36.0	86.7
Manchuria	2881	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.2	41.7	46.8	33.7	----	----	----	----	----	----	----	----	----	----	4	40.9	114.9
Do	2882	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	56.6	40.8	46.6	44.2	----	----	----	----	----	----	----	----	----	----	4	47.1	132.3
Do	2883	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	55.2	37.5	34.7	44.6	----	----	----	----	----	----	----	----	----	----	4	43.0	120.8
Do	2884	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	55.6	35.4	32.9	44.2	----	----	----	----	----	----	----	----	----	----	4	42.0	118.0
Do	2885	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	56.2	39.2	37.9	47.5	----	----	----	----	----	----	----	----	----	----	4	45.2	127.0
Hanna	2886	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	28.9	44.2	----	----	----	----	----	----	----	----	----	----	----	----	2	36.5	95.5
Silver Beardless	2887	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	26.7	----	----	----	----	----	----	----	----	----	----	----	----	----	1	26.7	69.9
Hybrid	2888	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	31.8	35.0	----	----	----	----	----	----	----	----	----	----	----	----	2	33.4	87.4
Do	2889	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	46.6	44.2	28.3	----	35.8	62.7	----	----	----	----	----	----	----	----	5	43.5	105.8
Do	2890	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.4	30.8	25.4	----	----	----	----	----	----	----	----	----	----	----	3	32.5	92.6
Do	2891	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	39.5	31.7	24.7	----	----	----	----	----	----	----	----	----	----	----	3	32.0	91.2
Do	2892	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	33.5	36.7	34.5	----	----	----	----	----	----	----	----	----	----	----	3	34.9	99.4
Do	2893	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	38.5	34.2	24.5	----	----	----	----	----	----	----	----	----	----	----	3	32.4	92.3
Do	2894	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	32.5	29.2	20.4	----	----	----	----	----	----	----	----	----	----	----	3	27.4	78.1
Do	2895	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	33.9	29.2	22.7	----	----	----	----	----	----	----	----	----	----	----	3	28.6	81.5
Do	2896	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	30.0	22.5	25.4	----	----	----	----	----	----	----	----	----	----	----	3	26.0	74.1
Cheney	2897	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	29.1	42.5	----	----	----	----	----	----	----	----	----	----	----	----	2	35.8	93.7
Australian White	2898	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	23.3	----	----	----	----	----	----	----	----	----	----	----	----	----	1	23.3	61.0
Champion of Vermont	2899	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	28.8	40.8	25.4	----	29.2	47.1	----	----	----	----	----	----	----	----	5	34.3	83.5
French Chevalier	2900	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	38.3	50.0	28.1	----	39.2	67.0	40.7	73.8	32.9	46.3	52.2	27.4	27.8	29.5	13	42.6	101.2
Golden Queen	2901	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	40.8	31.7	30.2	----	----	----	----	----	----	----	----	----	----	----	3	34.2	97.4
Hanna	2902	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	30.5	----	----	----	----	----	----	----	----	----	----	----	----	----	1	30.5	79.8

Chevalier	156																28.8														1	28.8	75.4
Tennessee Winter	257																11.7														1	11.7	30.6
Canadian Lake Shore	2750																33.4														1	33.4	87.4
Gottland	2749																36.8	35.0	20.0												3	30.6	87.2
Manchurian	739																37.0	36.7	34.3												3	36.0	102.6
Garton	266																32.0	45.0	24.9		23.3	50.1									5	35.1	85.4
Manchuria	2859																39.3														1	39.3	102.9
Do	2860																35.0														1	35.0	91.6
Do	2862																46.8	36.7													2	41.7	109.2
Do	2864																47.5														1	47.5	124.3
Daniels	2880																43.3	36.7													2	40.0	104.7
Mensury	2657																	40.8	42.0	41.7		64.2	52.1								5	48.2	112.9
Malting	2909																	38.3	29.7	38.3		60.7									4	41.7	98.1
Silver King	890																	43.3	31.4	38.3		69.3	47.5								5	46.0	107.7
Chevalier	2910																	40.8	25.4												2	33.1	100.9
Nepal	595																	25.8	26 9	22.5		26.6	25.2	35.6							6	27.1	59.6
Reed Triumph	889																		15.4	30.4		67.0	56.0								4	42.2	96.3
Hybrid	2911																		28.9	38.8		54.7									3	40.8	93.1
Do	2912																		26.6	35.0		56.2									3	39.3	89.7
Do	2913																		22.7	25.0		60.7									3	36.1	82.4
Do	2914																		26.2	38.3		61.6									3	42.0	95.9
Manchuria	2903																		25.6	44.2		69.9									3	46.6	106.4
Do	2904																		23.9	36 3		62.5									3	40.9	93.4
Do	2905																		28.7	39.2		73.9									3	47.3	108.0
Do	2906																		23.1	38.3		68.2									3	43.2	98.6
Do	2907																		24.7	35.0		65.3									3	41.7	95.2
Do	2908																		28.7	39.2		63.0									3	43.6	99.5
Do	2915																		28.3	30.8		57.6									3	38.9	88.8
Do	2916																		31.2	29.6		62.5									3	41.1	93.8
Do	2917																		26.2	40.8		70.5									3	45.8	104.6
Do	2918																		24.7	41.0		65.9									3	43.9	100.2
Hanna	2919																				38.3	65.0									2	51.7	95.0
Gisborne	1030																					17.7	9.7								2	13.7	25.8
Maltster	585																				10.0	21.5	14.3								3	15.3	30.4
Proskowetz	893																				40.0	63.0	33.5								3	45.5	90.5
Black	2726																				15.8	43.1	44.7	72.3							4	44.0	82.1
Chevalier	1170																					36.7	22.9								2	29.8	56.2
Baku	2920																					45.8									1	45.8	76.2
Sexradigt	607																					63.3	35.5								2	49.4	93.2
Coast	2921																					67.0	60.1	75.6							3	67.6	120.5
Scotch	2922																					75.1	56.1	70.8	33.8						4	58.9	107.1
Mansfield	2923																					64.7	51.5	74.5							3	63.6	113.4
Mensury	2924																					79.6	63.6	74.9							3	72.7	129.6
Manchuria	2925																					77.9	54.4	76.2							3	69.5	123.9
Do	2926																					68.8	60.2	72.4							3	67.1	119.6
Do	2823																					76.0	61.3	76.1	37.9	42.8	48.2	36.0	13.9		8	49.0	96.5
Do	2927																					77.1	59.6	66.4							3	67.7	120.7
Do	2928																					81.9	63.0	73.6	36.3	38.5	52.3				6	57.6	105.5
Do	2929																					70.5	61.3								2	65.9	124.3
Do	2930																					79.1	57.3	80.3							3	72.2	128.7

TABLE 28.—*Annual acre yields of varieties of barley grown at the Minnesota Agricultural Experiment Station (at St. Paul) in one or more of the 29 years from 1893 to 1921, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																													Years grown	Average yield (bus.)	Percentage of weighted mean
		1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
White Smyrna	195	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	48.7	33.8	----	----	----	----	----	----	----	2	41.3	77.9
Composite	1147	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	55.0	48.7	69.2	----	----	----	----	----	----	3	57.6	102.7
Gatami	575	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	69.3	48.8	----	----	----	----	----	----	----	2	59.1	111.5
Black Hull-less	1106	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.8	13.8	----	----	----	----	----	----	----	2	27.8	52.5
Hybrid	2931	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	73.9	52.1	75.4	----	----	----	----	----	----	3	67.1	119.6
Do	2932	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	70.2	41.3	81.0	----	----	----	----	----	----	3	64.2	114.4
Luth	908	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	52.7	74.7	----	----	----	----	----	----	2	63.7	120.6
Hanna	906	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	48.1	51.5	----	----	----	----	----	----	2	49.8	94.3
Featherston	911	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	45.8	52.5	----	----	----	----	----	----	2	49.1	93.0
Steigum	907	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	45.8	53.7	----	----	----	----	----	----	2	49.7	94.1
Eagle	913	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41.3	63.4	----	----	----	----	----	----	2	52.3	99.1
Servian	915	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	66.5	85.6	----	----	----	23.2	24.8	29.5	5	45.9	103.8
Mahrische	912	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	43.5	----	----	----	----	----	----	----	1	43.5	99.5
Black	2936	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50.3	----	----	----	----	----	----	1	50.3	74.4
Hybrid	2935	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	60.0	23.5	18.8	29.9	4	33.1	106.4
Minsturdi	1556	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	53.8	24.2	29.1	43.3	4	37.6	120.9
Svansota	1907	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	56.5	24.0	29.3	32.5	4	35.6	114.5
Aker	1577	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	34.0	29.0	27.5	3	30.2	113.5
Samofa	1211	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	25.7	26.9	28.0	3	26.9	101.1
Bohman	2933	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	26.9	27.7	23.0	3	25.9	97.4
Lion	923	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	21.6	24.3	31.2	3	25.7	96.6
Gold	1145	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	17.2	17.1	2	17.1	65.0
Manchuria	1478	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	29.4	23.0	2	26.2	99.6
Do	1189	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	25.7	23.0	2	24.3	92.4
Bark	2793	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	22.0	1	22.0	80.9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 12 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages											
			Chevalier II	Highland Chief	Svanhals	Hanna	Hannchen	Manchuria	Odessa	Coast	Nepal	Black Hull-less	Hybrid	Horsford
Chevalier II	200	Years comparable		4	5	5	5	8	4	2	1	1	5	(*)
		Percentage yield		96.1	97.7	91.2	102.4	71.7	69.7	93.7	126.0	90.8	91.0	
Highland Chief	883	Years comparable	4		1	4	4	5	2	(*)	(*)	3	4	3
		Percentage yield	104.1		110.3	101.0	111.7	82.7	94.2			109.7	103.2	105.3
Svanhals	187	Years comparable	5	1		6	6	9	6	3	4	4	6	2
		Percentage yield	102.3	90.6		97.7	110.5	76.0	84.5	85.9	167.6	121.1	96.6	118.6
Hanna	319	Years comparable	5	4	6		9	9	3	1	4	4	9	2
		Percentage yield	109.7	99.0	102.4		111.8	90.9	102.7	76.2	159.4	115.2	99.9	108.3
Hannchen	531	Years comparable	5	4	6	9		9	3	1	4	4	9	2
		Percentage yield	97.6	89.6	90.5	89.5		81.3	80.4	107.6	145.9	105.5	89.4	99.5
Manchuria	244	Years comparable	8	5	9	9	9		10	7	6	7	10	4
		Percentage yield	139.4	120.9	131.6	110.0	123.0		112.3	131.5	195.7	141.9	109.1	132.7
Odessa	182	Years comparable	4	2	6	3	3	10		5	4	7	3	4
		Percentage yield	143.6	106.2	118.3	97.4	124.3	89.1		115.2	163.7	120.6	95.9	123.7
Coast	690	Years comparable	2	(*)	3	1	1	7	5		2	3	2	3
		Percentage yield	106.8		116.4	131.2	92.9	76.1	86.8		168.3	123.5	86.2	98.3
Nepal	595	Years comparable	1	(*)	4	4	4	6	4	2		6	5	3
		Percentage yield	79.4		59.7	62.7	68.5	51.1	61.1	59.4		72.5	55.5	59.4
Black Hull-less	596	Years comparable	1	3	4	4	4	7	7	3	6		5	7
		Percentage yield	110	91.2	82.6	86.8	94.8	70.5	82.9	81.0	137.9		77.9	92.0
Hybrid	2838	Years comparable	5	4	6	9	9	10	3	2	5	5		3
		Percentage yield	109.9	96.9	103.5	100.1	111.8	91.7	104.3	116.0	180.2	128.4		118.2
Horsford	507	Years comparable	(*)	3	2	2	2	4	4	3	3	7	3	
		Percentage yield		94.9	84.3	92.3	100.5	75.4	80.9	101.8	168.4	108.7	84.6	

ST. PAUL, MINN.

Barley varieties have been tested at University Farm, St. Paul, Minn., in all of the 29 years from 1893 to 1921, inclusive. The annual yields given in Table 28 were furnished through the courtesy of the Minnesota Agricultural Experiment Station. During a part of the time the work was carried on in loose cooperation with the United States Department of Agriculture. The annual yields were not filed with the department but have been supplied by the Minnesota station for the years in which there was no connection with the Department of Agriculture as well as for the years of cooperation.

The history of the test at the Minnesota station has been like that at all the older stations of the United States. During the earlier years most of the varieties were not pedigreed, and the identification of many of them is not adequate. It is thought, however, that the chance of their being incorrectly identified is small. The facilities for keeping varieties pure were not so good as at present, and the barleys were grown on unreplicated plats. For these reasons the officials of the Minnesota station have expressed a desire that conclusions be drawn from the yields only when the limitations of the earlier experiments are taken into full consideration. The use made of the yields in this bulletin is but little affected by these conditions of experimentation.

The conditions at Minnesota were no different from those at any of the other stations in the same period, and the work was more carefully carried out and results more carefully recorded than at most places. When it is considered that this bulletin is intended to be partially historical and partially a comparison of commercial varieties and that one of the principal aims is to delimit all regions adapted to types of barley, it can be readily seen that the Minnesota results are most valuable. The large number of barleys of each type included is in a way equivalent to a replication of varieties. In many of the important sorts there was actual replication. Varieties were sent from Minnesota to other stations, reaccessioned at those places, and again brought back to Minnesota, so that the same variety was sometimes carried under two or several numbers. This happened at many stations. Where they could be definitely identified the yields of such duplications have been combined and the average yield reported as the yield of the variety.

The Minnesota station has been one of the most important distributing centers of barley varieties in the United States. From a historical standpoint Minnesota is an invaluable link in tracing the distribution of the early varieties. The Wisconsin Agricultural Experiment Station was responsible for the distribution of many of the varieties grown at the experiment stations under the name of Oderbrucker. The Minnesota station is responsible for a great many of the varieties grown under the name of Manchuria. In a similar way, the Central Experimental Farm at Ottawa, Canada, has furnished a large percentage of our named hybrids. These three stations have been the three most important points distributing to the experiment stations.

In Table 28 it will be seen that the average yields of the barley varieties at St. Paul have been very good. In the column of percentages, where the percentage yield of each variety is given, the rank of the Manchuria group must be very high, as most of the percentages over 100 are those of barleys of this group. Since 200 varieties were tested in one or more of the 29 years, an inspection of Table 28 is difficult. To analyze the results more readily a digest was made by arranging most of the varieties in eight groups. The Manchuria group, which included about 80 varieties, was the best, with the same large percentage superiority as in Wisconsin. The Coast group was second in point of yield, but contained only two varieties, which were grown but a few years. It is not thought that this group is well adapted to Minnesota, and the acre yields were far less than those of the Manchuria. The Hybrid and the Chevalier groups, which follow, were about equal, as were Hanna and Polar, which are next in rank. The Hull-less and Thorpe groups gave low yields.

Table 28 presents a summarized digest in which 12 varieties are compared. These were not selected because of their value, but because they were good varieties, representative of the different groups and were grown long enough to make comparisons possible. Manchuria (C. I. No. 244) was by far the best variety. A hybrid barley (C. I. No. 2838) gave very good yields, as did Highland Chief (C. I. No. 883), Odessa (C. I. No. 182), and Coast (C. I. No. 690).

Several conclusions can be definitely drawn from the earlier experiments. It is unquestionably demonstrated that Minnesota is in a region preeminently adapted to the production of barleys of the Manchuria group. This conclusion is supported by the experiments in the neighboring States as well as at the substations in Minnesota. The behavior of the hybrid barleys indicates that high-yielding 2-rowed sorts can be produced if desired. The Chevalier and Hanna barleys are not well adapted at St. Paul. This probably is caused by a disease factor, which might be overcome by crossing them with the more resistant Manchuria types. Manchuria (C. I. No. 244), which was widely distributed by the Minnesota station, was a very vigorous stock of barley. It produced high yields, not only at St. Paul but also at many stations to which it was sent. This barley is discussed elsewhere in this bulletin, as are several other varieties which were produced at Minnesota. In recent years the plats have been replicated and the varieties purified. Among the most promising of the new sorts are Manchuria (Minnesota No. 184; C. I. No. 2330), Minsturdi (C. I. No. 1556), Svansota (C. I. No. 1907), Aker (C. I. No. 1577), and Samofa (C. I. No. 1211).

WASECA, MINN.

Barleys were grown on the Southeastern Demonstration Farm and Substation at Waseca, Minn., from 1918 to 1921, inclusive. The annual yields, which are given in Table 29, were furnished through the courtesy of the Minnesota Agricultural Experiment Station. One of the best varieties at Waseca was the hybrid C. I. No. 2935 (Minnesota No. 438). It was developed in the breeding experiments cooperative between the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul. This hybrid is a selection from a cross of Lion × Manchuria. It is of especial interest because it is smooth awned. If Manchuria barleys with smooth awns could be developed they would be of great importance. The yield of this variety at Waseca is encouraging. Minsturdi (C. I. No. 1556), another hybrid, also yielded well. Manchuria (C. I. No. 2330), a selection made at the Minnesota station, was the most productive for the entire period. A selection of a French Chevalier gave good yields for this type of barley.

TABLE 29.—*Annual acre yields of varieties of barley grown at the Southeast Demonstration Farm and Substation at Waseca, Minn., in part or all of the four years from 1918 to 1921, inclusive*

[Data obtained through the courtesy of the Minnesota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1918	1919	1920	1921			
Manchuria	2330	66.0	34.8	33.5	47.8	4	45.5	120.4
French Chevalier	2900	56.1	29.8	37.4	34.3	4	39.4	104.2
Manchuria	244	58.5	--------	--------	--------	1	58.5	97.2
Hybrid	2935	--------	35.6	35.1	48.5	3	39.7	113.8
Minsturdi	1556	--------	37.2	33.2	42.6	3	37.7	108.0
Svansota	1907	--------	33.0	35.1	29.0	3	32.4	92.8
Manchuria	1478	--------	--------	31.2	35.8	2	23.5	67.0
Do	1189	--------	--------	31.7	28.2	2	30.0	85.5
Samofa	1211	--------	--------	33.4	38.3	2	35.9	102.3
Aker	1577	--------	--------	--------	34.4	1	34.4	95.0
Bohman	2933	--------	--------	--------	22.8	1	22.8	63.0

DULUTH, MINN.

Barley varieties were grown on the Northeast Demonstration Farm and Substation at Duluth, Minn., during the years 1919, 1920, and 1921. The yields from these tests were furnished by the Minnesota Agricultural Experiment Station and are reported in Table 30. Of the nine varieties included four were grown for all of the three years. Svansota (C. I. No. 1907) was the best of these. This hybrid seemed to be particularly well adapted to the district about Duluth, having produced the highest individual yield in each of the three years. Manchuria (C. I. No. 2330) was second in point of yield, while French Chevalier (C. I. No. 2900) was third. Two other Manchuria selections (C. I. Nos. 1478 and 1189) yielded well in 1920 and 1921.

The results at Duluth indicate that while Duluth is in a district that is best suited to barleys of the Manchuria type the summers are sufficiently cool to allow a normal development of varieties which do not grow normally in the higher temperatures to the south.

TABLE 30.—*Annual acre yields of varieties of barley grown at the Northeast Demonstration Farm and Substation at Duluth, Minn., in part or all of the three years from 1919 to 1921, inclusive*

[Data obtained through the courtesy of the Minnesota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)			Years grown	Average yield (bus.)	Percentage of weighted mean
		1919	1920	1921			
Manchuria	2330	47.1	45.1	25.5	3	39.2	107.4
French Chevalier	2900	41.3	33.5	30.4	3	35.1	96.2
Minsturdi	1556	42.6	40.1	29.0	3	37.2	101.9
Svansota	1907	53.7	50.1	33.5	3	45.8	125.5
Manchuria	1478		42.3	28.9	2	35.6	104.7
Do	1189		39.3	32.2	2	35.7	105.3
Aker	1577			28.3	1	28.3	98.3
Samofa	1211			25.7	1	25.7	89.2
Bohman	2933			25.4	1	25.4	88.2

GRAND RAPIDS, MINN.

The yields of barley varieties grown at the North-Central Experiment Farm at Grand Rapids, Minn., were furnished through the courtesy of the Minnesota Agricultural Experiment Station. These yields are reported in Table 31. Barley was grown in all of the years from 1918 to 1921, inclusive. Only 4 of the 21 varieties were grown for the full four years. Manchuria (C. I. No. 2330) produced the highest yield, as it did at Waseca. French Chevalier (C. I. No. 2900), Hanna (C. I. No. 319), and Nepal (C. I. No. 595) followed in the order named. For the three years in which Minsturdi (C. I. No. 1556) was grown it was slightly superior to Manchuria (C. I. No. 2330). Svansota (C. I. No. 1907), grown for the same years, gave higher yields than Hanna, but did not yield so well as Manchuria (C. I. No. 2330), French Chevalier (C. I. No. 2900), or Minsturdi. Samofa (C. I. No. 1211) is a hybrid between South African and Manchuria, produced at the Minnesota Agricultural Experiment Station. It was tested only in the year 1921, when it gave the highest yield. Although several hybrid varieties were very promising at Grand Rapids, barleys of the Manchuria type are unquestionably well adapted. It is probable that the hybrids are valuable in proportion to their resemblance to Manchuria, especially in the matter of disease resistance.

TABLE 31.—*Annual acre yields of varieties of barley grown at the North-Central Experiment Farm at Grand Rapids, Minn., in part or all of the four years from 1918 to 1921, inclusive*

[Data obtained through the courtesy of the Minnesota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1918	1919	1920	1921			
Manchuria	2330	51.5	37.5	34.1	14.5	4	34.4	115.1
French Chevalier	2900	50.3	34.8	30.5	9.9	4	31.4	105.0
Odessa	182	52.8	38.3		10.8	3	34.0	112.6
Hanna	319	55.7	29.7	24.7	12.0	4	30.5	102.0
Nepal	595	24.8	18.3	18.8	4.5	4	16.6	55.5
Manchuria	244	51.1				1	51.1	109.4
Blue Ribbon	611	46.7				1	46.7	100.0
Oderbrucker	2700	39.0				1	39.0	83.5
O. A. C. 21	1470	47.8				1	47.8	102.4
Golden Queen	558	47.7				1	47.7	102.1
Manchuria	241	50.3				1	50.3	107.7
Champion of Vermont	2899	40.7				1	40.7	87.2
Svanhals	187	49.0				1	49.0	104.9
Hybrid	2935		32.4	27.6	9.1	3	23.0	104.1
Svansota	1907		32.0	31.6	9.4	3	24.3	110.0
Minsturdi	1556		40.3	33.1	14.9	3	29.4	133.0
Aker	1577				11.8	1	11.8	98.3
Manchuria	1478				12.7	1	12.7	105.8
Do	1189				14.9	1	14.9	124.2
Samofa	1211				16.5	1	16.5	137.5
Bohman	2933				15.1	1	15.1	125.8

CROOKSTON, MINN.

The annual yields of barley varieties from the Northwest Experiment Farm at Crookston, Minn., were furnished through the courtesy of the Minnesota Agricultural Experiment Station. The yields for the years 1919 to 1921, inclusive, are reported in Table 32. Of the 21 varieties 13 were tested for the three years. Minsturdi (C. I. No. 1556) produced the highest yield for this period, while Manchuria (C. I. No. 2330), Beardless (C. I. No. 3144), O. A. C. 21 (C. I. No. 1470), and Hybrid (C. I. No. 2935) were second, third, fourth, and fifth. Of the varieties grown but two years Samofa (C. I. No. 1211) and Manchuria (C. I. No. 1189) were the best. Several of the varieties tested were produced at the Minnesota Agricultural Experiment Station at St. Paul. The origin, identity, and general value of the better ones are discussed elsewhere in this bulletin. At Crookston barleys of the Manchuria group are the superior ones. French Chevalier (C. I. No. 2900), Hannchen (C. I. No. 531), and Svanhals (C. I. No. 187), which represent three 2-rowed groups, did not compare favorably in yielding capacity with the Manchuria barleys.

TABLE 32.—*Annual acre yields of varieties of barley grown at the Northwest Experiment Farm at Crookston, Minn., in part or all of the three years 1919 to 1921, inclusive*

[Data obtained through the courtesy of the Minnesota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)			Years grown	Average yield (bus.)	Percentage of weighted mean
		1919	1920	1921			
Manchuria	2330	25. 9	30. 7	24. 4	3	27. 0	120. 0
Do	2823	22. 2	22. 3	17. 8	3	20. 8	92. 4
French Chevalier	2900	14. 4	30. 8	17. 0	3	20. 7	92. 0
Hybrid	2935	15. 8	31. 0	26. 4	3	24. 4	108. 4
Minsturdi	1556	25. 2	34. 3	25. 2	3	28. 2	125. 3
Svansota	1907	15. 5	28. 2	23. 1	3	22. 3	99. 1
Aker	1577	22. 4			1	22. 4	119. 8
Hanna	319	16. 6	26. 6	21. 4	3	21. 5	95. 6
O. A. C. 21	1470	26. 9	25. 8	21. 6	3	24. 8	110. 2
Beardless	3144	27. 2	32. 7	14. 7	3	24. 9	110. 7
Hannchen	531	9. 3	31. 3	16. 0	3	18. 9	84. 0
Svanhals	187	12. 8	31. 6	14. 9	3	19. 8	88. 0
Oderbrucker	2700	20. 2	26. 4	20. 0	3	22. 2	98. 7
Princess	529	13. 4	26. 7	18. 1	3	19. 4	86. 2
Nepal	595	12. 0			1	12. 0	64. 2
Manchuria	2823		22. 3	14. 9	2	18. 6	77. 5
Do	1189		34. 7	17. 6	2	26. 1	108. 7
Samofa	1211		36. 7	16. 1	2	26. 4	110. 0
Bohman	2933		25. 7	19. 9	2	22. 8	95. 0
Mahrische	912		26. 9	15. 2	2	21. 1	87. 9
Manchuria	1478		29. 7	14. 9	2	22. 3	92. 9

TABLE 33.—*Annual acre yields of varieties of barley grown at the West-Central Experiment Farm at Morris, Minn., in part or all of the four years from 1918 to 1921, inclusive*

[Data obtained through the courtesy of the Minnesota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1918	1919	1920	1921			
Manchuria	2330	38. 1	29. 4	32. 1	28. 8	4	32. 1	117. 2
French Chevalier	2900	35. 2	32. 7		21. 0	3	29. 6	102. 8
Manchuria	2823	41. 1		23. 0	29. 5	3	31. 2	116. 0
Wisconsin Pedigree	835	35. 7	25. 7	24. 9		3	28. 8	98. 0
Manchuria	244	30. 4				1	30. 4	81. 7
Oderbrucker	2700	42. 7				1	42. 7	114. 8
Hybrid	2935		24. 4	17. 0	11. 6	3	17. 7	70. 2
Minsturdi	1556		34. 3	19. 4	21. 3	3	25. 0	99. 2
Svansota	1907		31. 5	28. 7	21. 5	3	27. 2	107. 9
Manchuria	1478			24. 4	27. 0	2	25. 7	108. 0
Do	1189			30. 5	30. 6	2	30. 5	128. 2
Samofa	1211			16. 4	23. 7	2	20. 1	84. 5
Aker	1577				23. 4	1	23. 4	98. 7
Bohman	2933				22. 0	1	22. 0	92. 8

MORRIS, MINN.

Barley varieties were tested on the West-Central Experiment Farm at Morris, Minn., from 1918 to 1921, inclusive. The yields reported in Table 33 were furnished by the Minnesota Agricultural Experiment Station. The highest yields were obtained from varieties of the Manchuria type, of which Manchuria (C. I. No. 2330) and Manchuria (C. I. No. 1189) were probably the best. Svansota (C. I. No. 1907), the best of the hybrids, produced an average yield slightly less than that of Manchuria (C. I. No. 2330). The selection of French Chevalier (C. I. No. 2900) was better than the average at Morris. Although the varietal tests have been run only four years it is quite apparent that barleys of the Manchuria type are particularly well adapted to cultivation in this section.

AMES, IOWA

Varietal tests of barley were conducted at Ames, Iowa, in cooperation with the Iowa Agricultural Experiment Station from 1913 to 1921, inclusive. Ten varieties were tested, and all of them were carried in the experiment for the entire period. The annual yields are reported in Table 34. Through 1917 the yields were figured to check. From 1918 to 1921, inclusive, actual yields are given. The best two varieties were Oderbrucker (C. I. No. 1272) and Oderbrucker (C. I. No. 2700). Oderbrucker (C. I. No. 1272) is a pedigreed variety developed by the Wisconsin Agricultural Experiment Station under the pedigree No. 5. O. A. C. 21 (C. I. 1470) was third in point of yield. Like the Oderbrucker barleys it belongs to the Manchuria group. Following O. A. C. 21 is Manchuria (C. I. No. 241).

The 2-rowed varieties tested, Frankish (C. I. No. 295) and Hanna (C. I. No. 203), are barleys belonging to the Hanna group. Frankish gave an average yield of 111 per cent of the weighted mean, but was only fifth in point of yield. Hanna was quite inferior to Frankish, exceeding only the low-yielding hull-less and hooded varieties. Caucasian (C. I. No. 90), a Russian 6-rowed bearded sort, differing greatly from Caucasian (C. I. No. 2724) grown in Canada, gave fairly good yields, but was also surpassed by the Manchuria barleys. There is no question as to the types of barleys best suited to this district. The barleys of the Manchuria group are outstanding in yield at Ames, as they were in Wisconsin and Minnesota. For many years Oderbrucker has been the predominating variety grown on the farms in Iowa.

TABLE 34.—*Annual acre yields of varieties of barley grown at the Iowa Agricultural Experiment Station (at Ames) in the nine years from 1913 to 1921, inclusive*

[Data obtained in cooperation with the Iowa Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)									Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1917	1918	1919	1920	1921			
Caucasian	90	41. 5	32. 5	11. 0	40. 5	42. 1	26. 5	8. 0	26. 3	24. 3	9	28. 1	110. 6
Oderbrucker	2700	34. 0	43. 9	12. 7	36. 5	49. 2	35. 4	15. 4	27. 5	20. 8	9	30. 6	120. 5
Do	1272	41. 3	35. 0	11. 4	35. 8	49. 2	35. 4	20. 8	31. 3	20. 8	9	31. 2	122. 8
Manchuria	241	33. 9	35. 8	9. 5	32. 4	52. 9	30. 4	18. 3	31. 7	20. 8	9	29. 5	116. 1
O. A. C. 21	1470	35. 5	34. 2	16. 5	32. 0	50. 8	27. 5	16. 3	33. 8	22. 9	9	29. 9	117. 7
Frankish	295	40. 7	31. 7	12. 6	23. 2	54. 6	27. 5	12. 9	27. 5	22. 9	9	28. 2	111. 0
Hanna	203	36. 8	16. 9	10. 0	18. 7	42. 0	25. 4	2. 5	14. 6	20. 8	9	20. 9	82. 3
Black Hull-less	596	32. 2	22. 6	9. 1	28. 3	31. 2	21. 3	7. 9	18. 8	14. 6	9	20. 7	81. 5
Nepal	595	27. 0	18. 9	4. 0	21. 4	21. 3	26. 3	6. 3	20. 0	12. 5	9	17. 5	68. 9
Horsford	507	26. 3	19. 6	5. 2	26. 0	24. 2	18. 8	5. 4	16. 7	14. 6	9	17. 4	68. 5

TABLE 35.—*Annual acre yields of varieties of barley grown at the Missouri Agricultural Experiment Station (at Columbia) and at the soil-experiment farms at Lewistown, Carthage, Maryville, and Warrensburg, Mo., in one or more of the 12 years from 1910 to 1921, inclusive*

[Data obtained through the courtesy of the Missouri Agricultural Experiment Station]

Location and variety	C. I. No.	Acre yields (bushels)											Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1914	1915	1916	1917	1918	1919	1920	1921			
Columbia:															
Hanna	906	----	----	----	----	----	----	----	----	15. 8	6. 9	----	2	11. 3	59. 5
Steigum	907	----	----	----	----	----	----	----	----	26. 1	11. 6	----	2	18. 9	99. 5
Luth	908	----	----	----	----	----	----	----	----	32. 2	17. 5	21. 2	3	23. 6	112. 4
Eagle	913	----	----	----	----	----	----	----	----	28. 6	12. 2	----	2	20. 4	107. 4
Italian	914	----	----	----	----	----	----	----	----	9. 5	5. 5	----	2	7. 5	39. 5
Servian	915	----	----	----	----	----	----	----	----	30. 0	11. 8	----	2	20. 9	110. 0
Odessa	916	----	----	----	----	----	----	----	----	20. 3	7. 7	----	2	14. 0	73. 7
Lion	923	----	----	----	----	----	----	----	----	32. 8	18. 9	32. 3	3	28. 0	133. 3
Australian White	925	----	----	----	----	----	----	----	----	2. 1	----	----	1	2. 1	7. 4
Horn	926	----	----	----	----	----	----	----	----	32. 1	8. 2	----	2	20. 1	105. 8
Odessa	927	----	----	----	----	----	----	----	----	29. 5	14. 8	31. 9	3	25. 4	121. 0
Summit	929	----	----	----	----	----	----	----	----	31. 9	13. 6	28. 0	3	24. 5	116. 7
Club Mariout	932	----	----	----	----	----	----	----	----	26. 5	----	----	1	26. 5	93. 0
Odessa	934	----	----	----	----	----	----	----	----	14. 4	3. 5	----	2	8. 9	46. 8
Peruvian	935	----	----	----	----	----	----	----	----	31. 9	10. 3	----	2	21. 1	111. 1
Trebi	936	----	----	----	----	----	----	----	----	43. 5	14. 9	39. 6	3	32. 7	155. 7
Sandrel	937	----	----	----	----	----	----	----	----	47. 1	17. 8	39. 6	3	34. 8	165. 7
Oderbrucker	940	----	----	----	----	----	----	----	----	31. 5	12. 6	----	2	22. 1	116. 3
Frankish	953	----	----	----	----	----	----	----	----	29. 8	13. 6	33. 9	3	25. 8	122. 9
Manchuria	956	----	----	----	----	----	----	----	----	41. 7	12. 1	32. 6	3	28. 8	137. 1
Oderbrucker	957	----	----	----	----	----	----	----	----	34. 5	8. 6	----	2	21. 5	113. 2
Alpha	959	----	----	----	----	----	----	----	----	21. 5	11. 4	----	2	16. 5	86. 8
Luth	972	----	----	----	----	----	----	----	----	30. 5	4. 5	----	2	17. 5	92. 1
Red River	973	----	----	----	----	----	----	----	----	33. 3	6. 6	----	2	19. 9	104. 7
Featherston	1118	----	----	----	----	----	----	----	----	35. 3	6. 1	----	2	20. 7	108. 9
Do	1119	----	----	----	----	----	----	----	----	33. 1	3. 7	----	2	18. 4	96. 8
Do	1120	----	----	----	----	----	----	----	----	43. 8	13. 9	35. 0	3	30. 9	147. 1
Hanchamont	1121	----	----	----	----	----	----	----	----	18. 1	15. 6	----	2	16. 9	88. 9
Manchuria	1125	----	----	----	----	----	----	----	----	26. 5	6. 2	----	2	16. 3	85. 8
Malting	1129	----	----	----	----	----	----	----	----	22. 2	9. 3	----	2	15. 7	82. 6
Manchuria	244	----	----	----	----	----	----	----	----	----	8. 6	----	1	8. 6	83. 5
Oderbrucker	537	----	----	----	----	----	----	----	----	----	12. 2	38. 7	2	25. 5	160. 4
Nepal	595	----	----	----	----	----	----	----	----	----	2. 5	----	1	2. 5	24. 3
Black Hull-less	596	----	----	----	----	----	----	----	----	----	2. 5	----	1	2. 5	24. 3
Horsford	507	----	----	----	----	----	----	----	----	----	14. 6	27. 5	2	21. 1	132. 7
Lewistown:															
Horsford	507	----	2. 8	6. 1	----	----	----	----	----	----	----	----	2	4. 5	62. 5
Manchuria	244	----	3. 7	10. 8	----	----	----	----	----	----	----	----	2	7. 3	101. 4
Oderbrucker	537	----	----	10. 4	----	----	----	----	----	----	----	----	1	10. 4	114. 3
Nepal	595	----	----	9. 2	----	----	----	----	----	----	----	----	1	9. 2	101. 1
Carthage:															
Horsford	507	25. 7	6. 1	----	----	----	----	----	----	----	----	----	2	15. 9	102. 6
Manchuria	244	28. 5	4. 2	----	----	----	----	----	----	----	----	----	2	16. 3	105. 2
Nepal	595	24. 8	----	----	----	----	----	----	----	----	----	----	1	24. 8	94. 3
Black Hull-less	596	----	3. 7	----	----	----	----	----	----	----	----	----	1	3. 7	78. 7
Maryville:															
Manchuria	244	----	----	----	15. 2	----	----	29. 7	36. 8	18. 5	31. 6	----	5	26. 4	94. 6
Horsford	507	----	----	----	15. 4	----	22. 7	29. 3	----	30. 3	36. 3	26. 3	6	26. 7	101. 1
Oderbrucker	537	----	----	----	14. 4	----	----	36. 5	37. 3	----	46. 3	29. 9	5	32. 9	115. 8
Black Hull-less	596	----	----	----	----	----	----	----	----	----	13. 1	----	1	13. 1	41. 2
Warrensburg:															
Manchuria	244	----	----	----	3. 4	25. 3	25. 7	----	----	----	5. 5	----	4	15. 0	127. 1
Oderbrucker	537	----	----	----	2. 7	8. 2	14. 8	----	----	----	6. 7	12. 7	5	9. 0	77. 6
Nepal	595	----	----	----	. 7	----	----	----	----	----	----	----	1	. 7	25. 9
Horsford	507	----	----	----	4. 0	25. 1	19. 2	----	----	----	----	8. 5	4	14. 2	113. 6

COLUMBIA, MO.

The yields of barley varieties grown at Columbia, Mo., were furnished through the courtesy of the Missouri Agricultural Experiment Station. The yields for the years 1910 to 1921, inclusive, are reported in Table 35. In 1919 30 varieties were grown, 28 of which were continued in the experiment the following year. Five other varieties were introduced in 1920. This was a year of very low yields, and only a few of the better sorts were continued in 1921. Of these Sandrel (C. I. No. 937) and Trebi (C. I. No. 936) were undoubtedly the best. Two varieties of the Manchuria group, Featherston (C. I. No. 1120) and Manchuria (C. I. No. 956), were third and fourth, respectively. Lion (C. I. No. 923), a 6-rowed smooth-awned barley, also gave a high average yield. Oderbrucker (C. I. No. 537) produced the highest yield of the five varieties introduced in 1920. It was, however, surpassed by Trebi, Sandrel, and Lion. The 2-rowed sorts were quite inferior. Frankish (C. I. No. 953) and Horn (C. I. No. 926) were the only ones whose averages exceeded that of the weighted mean. While a 3-year test is not of sufficient length to make any definite statements regarding the value of the individual varieties, it would seem that there is an overlapping of growing conditions here. Barleys of the Manchuria group and such varieties as Sandrel and Trebi, usually grown under the more arid conditions of the Western States, gave relatively high yields in this locality. The barley commonly grown in this region, however, is of the Manchuria-Oderbrucker type.

The Missouri station has conducted barley experiments at four of its soil-experiment fields. These are located at Lewistown, Warrensburg, Carthage, and Maryville, Mo. At each of these places four varieties were tested, two of which, Manchuria (C. I. No. 244) and Horsford (C. I. No. 507), were carried at all of them.

At Lewistown Manchuria (C. I. No. 244) and Oderbrucker (C. I. No. 537) produced the best yields, the former having been grown in the years 1911 and 1912 and the latter in 1912 only. Horsford (C. I. No. 507), grown in 1911 and 1912, and Nepal (C. I. No. 595), grown in 1911, did not compare favorably with the other two.

At Warrensburg these same four varieties were tested during the years from 1914 to 1916, inclusive, and in 1920 and 1921. Manchuria (C. I. No. 244) was again the leading variety, but Horsford was superior to Oderbrucker at this station. Nepal (C. I. No. 595) gave such a low yield in 1914 that it was not continued further in the experiment.

The results at Maryville are quite comparable to those at Warrensburg. Oderbrucker (C. I. No. 537) was first in point of yield, Horsford (C. I. No. 507) second, Manchuria (C. I. No. 244) third, and Black Hull-less fourth. The Manchuria and Oderbrucker varieties belong to the same varietal group and are almost identical. At Warrensburg, however, Manchuria gave the higher yields.

Varieties were tested at Carthage during the years 1910 and 1911. Oderbrucker was not grown at this station, but both Nepal and Black Hull-less were included. Manchuria (C. I. No. 244) was again the leading variety, with Horsford following. The Hull-less varieties Nepal (C. I. No. 595) and Black Hull-less (C. I. No. 596) were grown for only one year, Nepal in 1910 and Black Hull-less in 1911, and were the lowest in point of yield in these years.

Results at these four stations indicate that Manchuria (C. I. No. 244) and Oderbrucker (C. I. No. 537) were the best of the varieties tested. At both Maryville and Warrensburg, however, Horsford gave relatively higher yields than is usually the case.

FARGO, N. DAK.

Varietal tests of barley have been made at the North Dakota Agricultural Experiment Station at Fargo since 1892. There were developed at this station a number of strains which have been tested at other places. The North Dakota station, like those of Minnesota, Wisconsin, and Ontario, was a center for the distribution of varieties to other stations. It is an important link in the tracing of varieties. At Fargo, as at many other places, the same variety was introduced more than once and in some cases was carried under different numbers at the same time. Manchuria (C. I. No. 244) was grown under North Dakota Nos. 788 and 792 for eight years. The average yield of the variety under each of these two numbers was exactly the same at the end of this period. The average deviation from the mean was only 0.9 bushel, while the maximum deviation from the mean was only 1.6 bushels. This is of special interest, since many agronomists feel that the earlier tests, which were conducted without any replication of plats, are not of significant value. It is unlikely that the slight variations of yield shown by these two varieties are typical of what might be expected. Probably the actual accuracy is far less than is indicated by this comparison. The writers feel, however, that the value of this early work has been underestimated. Certainly, the deviation from the mean was very slight when compared with an average yield of more than 38 bushels.

The data reported in Table 36 were obtained through the courtesy of the North Dakota Agricultural Experiment Station. A group digest of the varieties was made, which showed the Manchuria group to be the best of six compared.

The Thorpe group was much inferior to the Manchuria, while the Chevalier was slightly inferior to the Thorpe. Higher yields were obtained from the Hanna than from the Hull-less or the Horsford groups. In the summarized digest of Table 36 eight well-known varieties belonging to different groups are compared. Manchuria (C. I. No. 244) is the best variety. Chevalier II (C. I. No. 200) is superior to all except Manchuria. No comparison between Chevalier II and Odessa (C. I. No. 182) was possible, as they were not grown in the same years. Hannchen (C. I. No. 531) produced yields almost as high as those of Chevalier II. Mansury (C. I. No. 617) is a representative of the Thorpe group. Mansury was superior to Odessa, Evans (C. I. No. 892), Horsford (C. I. No. 507), and Nepal (C. I. No. 595).

In recent years several promising selections of Manchuria have been made at the North Dakota station. Manchuria (C. I. No. 2945; N. Dak. 2119), Manchuria (C. I. No. 2947; N. Dak. 2121), Manchuria (C. I. No. 2949; N. Dak. 2123), and Manchuria (C. I. No. 2951; N. Dak. 2125) are among the best of these. The Michigan selection of Lion (C. I. No. 923) gave high yields in 1920 and 1921, the only years in which it was tested. The results here demonstrate that Fargo is in the section where Manchuria barleys are particularly adapted. Barleys of the Chevalier, Thorpe, and Hanna groups yielded relatively higher than at St. Paul or Madison. Although the Manchuria barleys are the ones best adapted, it is evident that the conditions are increasingly favorable to the production of 2-rowed barleys in the districts north and west of Madison and St. Paul.

TABLE 36.—*Annual acre yields of varieties of barley grown at the North Dakota Agricultural Experiment Station (at Fargo) in one or more of the years from 1892 to 1921, inclusive*

[Data for the years 1899 to 1908, inclusive, obtained in cooperation with the North Dakota Agricultural Experiment Station; data for the remaining years furnished through the courtesy of the North Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																										Years grown	Average yield (bus.)	Percentage of weighted mean
		1892	1893	1894	1895	1896	1898	1899	1900	1901	1902	1903	1904	1906	1907	1908	1909	1910	1911	1912	1913	1914	1916	1917	1919	1920	1921			
Prize Prolific	169	18. 3	24. 2	13. 8	53. 8																							4	27. 5	94. 8
Goldthorpe	327	28. 0																										1	28. 0	121. 2
Carter	2942		21. 9	13. 8	46. 0																							3	27. 2	93. 1
Baxter	185		14. 6							40. 4	54. 8	36. 8	30. 0	18. 1	41. 9	62. 0	14. 6	33. 2	16. 9	48. 0								12	34. 3	94. 5
Champion of Vermont	1892		25. 9	11. 5	51. 5	62. 7	42. 7	41. 6	10. 6																			7	35. 2	104. 8
New Zealand	2656		22. 3	11. 7	47. 5																							3	27. 2	93. 1
Chevalier	2802		21. 9	13. 5	72. 0	42. 7	57. 2	43. 0																				6	41. 7	111. 8
Mansury	617		25. 9	15. 2	77. 0	54. 1	52. 6	46. 1	16. 8		57. 1	33. 0	35. 9	12. 6	66. 1	61. 3		27. 5	12. 9	44. 5	41. 4	20. 6						18	38. 9	102. 9
Manchuria	241		26. 6	10. 8	52. 0		48. 0	52. 3	12. 1	46. 0	55. 8	40. 8	32. 4	20. 2	55. 9	58. 4	18. 5	32. 8	18. 7	51. 7								17	37. 2	104. 5
Salzer	2943		20. 4	14. 5	67. 5																							3	34. 1	116. 8
Sibley Imperial	2805		28. 9	12. 7	24. 5																							3	22. 0	75. 3
Highland Chief	[illegible]83		25. 5	13. 3	65. 0	50. 8	54. 8	42. 7		25. 3	45. 0	42. 7	40. 7	11. 0	47. 5													12	38. 7	104. 9
Highland Scotch	2941		29. 7	11. 7	57. 5	60. 0	49. 8	45. 2																				6	42. 3	113. 4
Black Hull-less	596		32. 0	10. 1	50. 3																							3	30. 8	105. 5
Nepal	595		9. 4	6. 3	39. 0			32. 7	6. 1	21. 7	29. 4							12. 5	11. 7	24. 1	29. 1	15. 6						12	19. 8	55. 0
Hull-less	2939		22. 9	7. 7	48. 5																							3	26. 4	90. 4
Success	891			5. 7	35. 0		63. 1	47. 2	25. 8	34. 8	46. 4	45. 3	34. 1	13. 9	45. 2													11	36. 0	102. 0
Hoover Hull-less	2938			12. 5	37. 5		36. 5	25. 4																				4	28. 0	72. 0
Bernard	881			10. 8	60. 3	48. 2	48. 5	42. 4	12. 2	37. 6	56. 3	38. 1	29. 4	16. 9	54. 3													12	37. 9	105. 6
Horsford	507						36. 9	36. 9	11. 3	34. 4	49. 3	34. 9	19. 2	17. 7	41. 0	22. 0		29. 3	15. 0	40. 0	41. 5							14	30. 7	78. 9
Evans	892						48. 2	38. 2	13. 0	32. 9	48. 1	35. 4	28. 1	16. 2	45. 0	57. 0	17. 1	12. 5	22. 5	40. 8	38. 3	45. 2						16	33. 7	88. 9
Russian	2795						42. 2	44. 1	12. 7			39. 1	26. 6	17. 9	46. 9	52. 7												8	35. 3	93. 9
Silver King	890						47. 8	44. 7	11. 2	38. 3	55. 3	40. 7	27. 7	19. 5	53. 1	56. 0	17. 8	31. 2	28. 8	48. 7								14	37. 2	101. 1
French Chevalier	175						47. 5	50. 6	20. 2																			3	39. 4	111. 3
Odessa	182						49. 0	49. 1	13. 0																			3	37. 0	104. 5
Culver	2825						41. 9	49. 2	25. 4																			3	38. 8	109. 6
Golden Queen	558						43. 8	46. 5	11. 4	30. 6	59. 4	40. 7	25. 6															7	36. 9	100. 0
Sisolsk	89							52. 1	14. 1																			2	33. 1	110. 0
Kostroma	84							28. 1	20. 2																			2	24. 1	80. 1
Manchuria	244							50. 6	17. 2	41. 8	53. 5	39. 7	31. 9	17. 3	57. 6	61. 0	22. 5	33. 5	19. 2	47. 9	65. 1	46. 1	23. 8	58. 5	27. 7	44. 3	35. 4	20	39. 7	107. 0
Turkestan	2715								11. 4		57. 3	16. 8	28. 3															4	28. 5	86. 9
Hanna	203									34. 1	48. 9	40. 2	33. 1	16. 6	53. 2													6	37. 7	103. 3
Manchuria	882										63. 1	40. 3	30. 2	18. 3	61. 2	53. 6	24. 5	23. 1	22. 1	48. 3								10	38. 5	103. 2
Senca Purple	2937										48. 2	36. 6	30. 6															3	38. 5	98. 7
Hanna	319												25. 0	13. 7	50. 8	55. 3	18. 3	29. 3	13. 3	45. 4								8	31. 4	87. 5
Princess	529												33. 0	9. 2	49. 6	47. 3		33. 7	10. 8	49. 1								7	33. 2	88. 5

Chevalier II	200	----	----	----	----	----	----	----	----	----	----	----	41. 5	13. 3	47. 9	61. 0	----	40. 6	18. 8	55. 0	55. 6	26. 5	----	----	----	----	----	9	40. 0	102. 3
Hannchen	531	----	----	----	----	----	----	----	----	----	----	----	27. 7	18. 1	46. 9	67. 7	20. 0	23. 1	18. 5	55. 8	63. 0	33. 1	9. 0	50. 9	16. 5	30. 9	23. 4	15	33. 6	90. 1
Primus	532	----	----	----	----	----	----	----	----	----	----	----	27. 3	7. 7	56. 2	64. 6	----	33. 7	10. 4	50. 4	52. 8	32. 9	----	----	----	----	----	9	37. 3	95. 4
Manchuria	2944	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50. 3	19. 7	45. 6	30. 0	42. 0	57. 5	45. 0	----	----	----	----	----	7	41. 4	104. 0
Do.	2945	----	----	----	----	----	----	----	----	----	----	----	----	----	----	53. 5	35. 0	49. 4	32. 5	56. 6	53. 2	45. 0	27. 4	57. 1	35. 8	45. 9	41. 1	12	44. 4	113. 8
Do.	2946	----	----	----	----	----	----	----	----	----	----	----	----	----	----	62. 5	17. 0	48. 1	35. 0	60. 8	59. 1	39. 0	----	----	----	----	----	7	45. 9	115. 3
Do.	2947	----	----	----	----	----	----	----	----	----	----	----	----	----	----	66. 0	20. 8	46. 9	34. 4	59. 2	61. 7	41. 7	26. 2	57. 6	32. 8	46. 2	39. 1	12	44. 4	113. 8
Hull-less	2948	----	----	----	----	----	----	----	----	----	----	----	----	----	----	37. 3	----	----	----	----	----	----	----	----	----	----	----	1	37. 3	66. 3
Manchuria	2949	----	----	----	----	----	----	----	----	----	----	----	----	----	----	61. 5	26. 7	48. 1	31. 3	53. 3	62. 7	44. 8	----	60. 1	----	----	----	8	48. 6	120. 0
Do.	2950	----	----	----	----	----	----	----	----	----	----	----	----	----	----	59. 0	17. 0	46. 9	34. 4	54. 5	55. 8	43. 1	----	----	----	----	----	7	44. 4	111. 6
Do.	2951	----	----	----	----	----	----	----	----	----	----	----	----	----	----	73. 0	22. 5	47. 4	32. 9	56. 2	53. 4	40. 6	----	49. 4	----	----	----	8	46. 9	115. 8
Do.	2952	----	----	----	----	----	----	----	----	----	----	----	----	----	----	52. 5	20. 0	47. 4	33. 3	54. 1	52. 5	41. 7	----	----	----	----	----	7	43. 1	108. 3
Oderbrucker	836	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	13. 1	50. 1	53. 0	43. 8	----	----	----	----	----	4	40. 0	99. 7
Wisconsin Pedigree	835	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	10. 4	57. 5	63. 5	----	----	53. 1	25. 6	41. 3	35. 6	7	41. 0	103. 5
Wing Pedigree	1177	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	52. 9	19. 1	20. 3	19. 0	4	27. 8	74. 1
Horsford	1271	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	32. 2	19. 4	24. 0	19. 5	4	23. 8	63. 5
Lion	923	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	41. 7	42. 7	2	42. 2	122. 7

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF EIGHT REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages							
			Chevalier II	Mansury	Hannchen	Manchuria	Odessa	Evans	Nepal	Horsford
Chevalier II	200	Years comparable	----	9	9	9	(*)	9	5	8
		Percentage yield	----	111. 6	101. 8	94. 9	----	117. 9	211. 3	147. 9
Mansury	617	Years comparable	9	----	9	13	3	14	11	13
		Percentage yield	89. 6	----	91. 2	88. 0	104. 0	108. 2	178. 3	128. 6
Hannchen	531	Years comparable	9	9	----	15	(*)	10	5	8
		Percentage yield	98. 3	109. 6	----	85. 3	----	115. 9	208. 1	142. 1
Manchuria	244	Years comparable	9	13	15	----	2	15	9	13
		Percentage yield	105. 4	113. 6	117. 3	----	109. 2	123. 4	205. 0	136. 6
Odessa	182	Years comparable	(*)	3	(*)	2	----	3	2	3
		Percentage yield	----	96. 2	----	91. 6	----	111. 8	160. 1	130. 6
Evans	892	Years comparable	9	14	10	15	3	----	9	14
		Percentage yield	84. 8	92. 4	86. 3	81. 1	89. 5	----	159. 4	110. 9
Nepal	595	Years comparable	5	11	5	9	2	9	----	8
		Percentage yield	47. 3	56. 1	48. 1	48. 8	62. 5	62. 7	----	64. 9
Horsford	507	Years comparable	8	13	8	13	3	14	8	----
		Percentage yield	67. 6	77. 8	70. 4	73. 2	76. 6	90. 2	154. 0	----

TABLE 37.—*Annual acre yields of varieties of barley grown at the Edgeley (N. Dak.) substation in two or more of the years from 1903 to 1921, inclusive*

[Data for 1904 to 1909, inclusive, obtained in cooperation with the North Dakota Agricultural Experiment Station, through whose courtesy the data for other years were obtained]

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1903	1904	1905	1906	1907	1908	1909	1910	1911	1914	1920	1921			
Evans	892	21.1	42.1	50.6	25.3									4	34.8	86.6
Mansury	617	22.5	57.8	60.8	42.7	10.8	19.0	32.4	1.7	1.5				9	27.8	131.1
Manchuria	244	24.6	40.3	48.1	39.5	10.1	21.1	34.3	2.1	1.0	38.0	28.6	12.7	12	25.0	117.4
Do	241	22.1	49.9	53.5	39.5	8.1	21.8	28.7	7.1	.5				9	25.7	121.2
Horsford	507		48.3	37.6	24.3		15.0							4	31.3	101.6
Club Mariout	261		44.0	48.8		18.9	30.3	43.2	8.8	14.6				7	29.8	143.3
Beldi Dwarf	190		43.5	40.2		10.8								3	31.5	105.7
Telli	194		28.8	50.8		27.0	14.8							4	30.3	111.4
Nepal	595			37.6		14.1	22.0	30.5	3.0	1.6		21.0	9.0	8	17.3	87.8
Blue Ribbon	611					10.8	33.8	41.7	6.7	7.0				5	20.0	109.3
New Moravian	2796					8.9	27.4	31.2	1.1	2.5				5	14.2	77.6
Oderbrucker	2700					16.2	22.2	34.5	2.8	.5				5	15.2	83.1
Bohemian	27					29.7	26.8	35.1	4.4	2.5				5	19.7	107.7
Do	32					18.9	20.4	31.9	5.0	1.0				5	15.4	84.2
Mensury	170					18.9	31.6	33.9	3.4	2.5				5	18.1	98.9
Princess	529					18.2	6.3							2	12.3	53.2
Hanna	24					36.5	18.3	41.4	2.3	3.0				5	20.3	110.9
Chevalier II	200					20.3	16.9	30.1	.6	1.5				5	13.9	76.0
Primus	532					16.2	23.2	31.5	5.9	2.0	26.8			6	17.6	94.6
Hanna	203					33.7	28.5	36.3	3.1	1.7				5	20.7	113.1
Horn	31					18.9	21.1							2	20.0	86.6
Striegum	47					27.0	26.1	37.1	2.7	2.5				5	19.1	104.4
Goldfoil	162					18.9	17.6							2	18.3	79.2
Kitzing	167					13.5	6.3							2	9.9	42.9
Surprise	171					8.1	19.0							2	13.5	58.4
Summit	174					24.3	28.2	35.2	5.9	1.5				5	19.0	103.8
Common	184					32.4	13.4							2	22.9	99.1
Svanhals	187					27.0	28.2	30.5	5.0	2.5				5	18.6	101.6
Black Smyrna	191					35.1	40.8	41.0	14.3	12.1				5	28.7	156.8
White Smyrna	195					32.4	38.7	41.0	6.5	11.0				5	25.9	141.5
Frankish	207					24.3	17.6	31.1	4.6	1.0				5	15.7	85.8
Highland Chief	883					16.2	12.6	36.8	3.8	2.4				5	14.4	78.7
Gatami	575					27.0	31.7	42.8	7.4	13.6				5	24.5	133.9
Kitzing	189					37.8	23.2	32.6	1.0	1.0				5	19.1	104.4
Odessa	182					37.8	44.2							2	41.0	177.5
Golden Queen	558					27.0	35.9	30.0	2.1	1.0				5	19.2	104.9
Robertson	559					43.2	20.4	38.6	4.8	2.0				5	21.8	119.1
Hannchen	531					31.1	31.3	33.0	5.8	2.0	29.3			6	22.1	118.8

Bavarian	158	--------	--------	--------	--------	24.3	30.3	35.9	6.9	1.0	--------	--------	--------	5	19.7	107.7
Do	159	--------	--------	--------	--------	18.9	15.0	30.1	7.1	3.0	--------	--------	--------	5	14.8	80.9
Black Hull-less	596	--------	--------	--------	--------	--------	21.4	36.7	6.1	3.6	--------	--------	--------	4	16.9	99.4
Reed Triumph	889	--------	--------	--------	--------	--------	--------	30.9	1.4	.5	--------	--------	--------	3	10.9	76.2
Oderbrucker	836	--------	--------	--------	--------	--------	--------	--------	--------	--------	33.0	30.4	11.7	3	25.0	106.4
Do	1272	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	29.7	11.3	2	20.5	106.2

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages									
			Chevalier II	Mansury	Svanhals	Hanna	Hannchen	Manchuria	Club Mariout	White Smyrna	Nepal	Summit
Chevalier II	200	Years comparable	--------	5	5	5	5	5	5	5	5	5
		Percentage yield	--------	106.1	74.5	67.2	67.2	101.2	59.9	53.5	97.5	73.0
Mansury	617	Years comparable	5	--------	5	5	5	9	7	5	6	5
		Percentage yield	94.2	--------	70.2	63.3	63.4	113.2	88.7	50.5	116.0	68.8
Svanhals	187	Years comparable	5	5	--------	5	5	5	5	5	5	5
		Percentage yield	134.3	142.5	--------	90.2	90.3	135.9	80.5	71.9	130.9	98.0
Hanna	203	Years comparable	5	5	5	--------	5	5	5	5	5	5
		Percentage yield	148.8	158.0	110.8	--------	100.1	150.6	89.2	79.7	145.1	108.6
Hannchen	531	Years comparable	5	5	5	5	--------	6	5	5	5	5
		Percentage yield	148.7	157.8	110.7	99.9	--------	124.3	89.1	79.6	144.9	108.5
Manchuria	244	Years comparable	5	9	5	5	6	--------	7	5	8	5
		Percentage yield	98.8	88.4	73.6	66.4	80.5	--------	75.3	52.9	113.8	72.1
Club Mariout	261	Years comparable	5	5	5	5	5	7	--------	5	6	5
		Percentage yield	166.9	112.8	124.3	112.1	112.2	132.9	--------	89.4	151.3	121.8
White Smyrna	195	Years comparable	5	5	5	5	5	5	5	--------	5	5
		Percentage yield	186.7	198.2	139.1	125.5	125.6	188.9	111.9	--------	182.0	136.3
Nepal	595	Years comparable	5	6	5	5	5	8	6	5	--------	5
		Percentage yield	102.6	86.2	76.4	68.9	69.0	87.8	66.1	54.9	--------	74.9
Summit	174	Years comparable	5	5	5	5	5	5	5	5	5	--------
		Percentage yield	137.0	145.4	102.0	92.1	92.2	138.6	82.1	73.4	133.6	--------

EDGELEY, N. DAK.

Varietal tests of barley were made at the Edgeley substation in North Dakota in 12 of the 19 years from 1903 to 1921, inclusive. During the years 1904 to 1909, inclusive, they were in cooperation with the United States Department of Agriculture. The yields before and after these dates were obtained through the courtesy of the North Dakota Agricultural Experiment Station. The annual yields are given in Table 37. A group digest not reported here showed the Chevalier and Hanna groups to exceed the Manchuria in yield. The Hybrid, Hull-less, and Thorpe groups follow in the order named.

In the summarized digest of Table 37, in which 10 individual varieties representing different groups are compared, it is still more apparent that the Manchuria barleys do not hold here the position of prominence that they maintain throughout most of the Mississippi Valley. White Smyrna (C. I. No. 195), Club Mariout (C. I. No. 261), Hanna (C. I. No. 203), and Hannchen (C. I. No. 531) produced yields in the order named. The two highest yielding sorts were varieties which do best where the ripening season comes during a period of dry weather. The Hanna and Hannchen also are varieties that produce their best yields in regions in which the diseases that flourish in hot humid climates do not occur. It will be remembered that at the Canadian stations, the results of which have already been presented, the 2-rowed barleys began to yield relatively well in about the same longitude in Canada. The conditions favorable to the production of 2-rowed barley which exist in New York State probably obtain far to the north of the Mississippi Valley in Canada, but extend south again into the northern Great Plains of the United States.

LANGDON, N. DAK.

The results of barley varietal experiments at the Langdon substation in North Dakota (Table 38) were furnished through the courtesy of the North Dakota Agricultural Experiment Station. Only three varieties, all of the Manchuria type, Manchuria (C. I. Nos. 244 and 241) and Common (C. I. No. 184), were tested for the full seven years of the experiment, 1909 to 1915, inclusive. Of these three, Common produced the highest average yield. Manchuria (C. I. Nos. 241 and 244) followed, being almost the equal of Common. Silver King (C. I. No. 890), a pedigreed Manchuria barley, was grown from 1909 to 1914, inclusive. It produced comparatively high yields, as did Mansury (C. I. No. 617), a barley of the Thorpe group, which was grown for the same period. Two hull-less varieties, Evans (C. I. No. 892) and Nepal (C. I. No. 595), were low yielders, as was also Horsford (C. I. No. 507). Three new sorts, Oderbrucker (C. I. No. 836), Hannchen (C. I. No. 531), and Primus (C. I. No. 532), were grown in 1914 and 1915. Hannchen produced an average yield slightly higher than that of Oderbrucker and Primus. The results obtained indicate that, while Langdon is still in the Manchuria district, the 2-rowed barleys can be grown with almost equal success. These results correspond with those found at Edgeley.

TABLE 38.—*Annual acre yields of varieties of barley grown at the Langdon (N. Dak.) substation in part or all of the seven years from 1909 to 1915, inclusive*

[Data obtained through the courtesy of the North Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1909	1910	1911	1912	1913	1914	1915			
Manchuria	244	38. 5	15. 1	38. 7	37. 3	29. 2	12. 5	41. 5	7	30. 4	105. 6
Do	241	41. 6	17. 3	40. 1	37. 0	28. 3	15. 8	40. 1	7	31. 5	109. 4
Silver King	890	44. 5	15. 7	39. 0	34. 7	26. 7	12. 1	------	6	28. 8	107. 1
Common	184	42. 7	13. 6	39. 6	39. 3	35. 0	16. 3	36. 7	7	31. 9	110. 8
Evans	892	51. 4	10. 1	25. 0	26. 6	22. 0	16. 3	------	6	25. 2	93. 7
Mansury	617	37. 0	10. 0	30. 7	53. 0	26. 7	12. 9	------	6	28. 4	105. 6
Horsford	507	------	14. 8	34. 4	31. 7	20. 3	15. 0	31. 0	6	24. 5	90. 4
Nepal	595	------	9. 1	36. 6	30. 5	22. 0	------	------	4	24. 5	88. 1
Oderbrucker	836	------	------	------	------	------	17. 1	44. 2	2	30. 7	119. 5
Hannchen	531	------	------	------	------	------	15. 3	48. 1	2	31. 9	124. 1
Primus	532	------	------	------	------	------	13. 3	48. 1	2	30. 7	119. 5

MANDAN, N. DAK.

Six varieties of barley were grown at the United States Northern Great Plains Field Station at Mandan, N. Dak., from 1916 to 1921, inclusive. This work was carried on in cooperation with the Office of Dry-Land Agriculture Investigations, United States Department of Agriculture. The barley varieties, although few in number, represent several groups. White Smyrna (C. I. No. 195) gave the highest yields, as will be seen in Table 39. Hannchen (C. I. No. 531) was somewhat less productive than White Smyrna, and Svanhals (C. I. No. 187) was third in point of yield. Coast (C. I. No. 690) and Club Mariout (C. I. No. 261) ranked fourth and fifth, while Manchuria (C. I. No. 244) was last. Here, again, it is evident that the Manchuria barleys are not better adapted than those of other types. The six years reported, however, contain no years of high yields. It is likely that the Manchuria would produce relatively higher yields in years of greater rainfall. The best three varieties were 2-rowed sorts.

TABLE 39.—*Annual acre yields of varieties of barley grown at the United States Northern Great Plains Field Station (Mandan, N. Dak.) in the six years from 1916 to 1921, inclusive*

[Data obtained in cooperation with the Office of Dry-Land Agriculture Investigations]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1916	1917	1918	1919	1920	1921			
White Smyrna	195	29.0	23.1	25.0	21.8	11.3	7.7	6	19.7	117.3
Club Mariout	261	25.8	14.5	22.6	13.6	10.8	7.3	6	15.8	94.0
Coast	690	25.8	16.8	24.5	17.5	11.4	2.9	6	16.5	98.2
Manchuria	244	20.8	8.1	17.6	13.7	11.4	.6	6	12.0	71.4
Hannchen	531	31.0	20.4	25.3	20.4	16.0	0	6	18.9	112.5
Svanhals	187	26.2	20.3	26.2	18.7	18.1	0	6	18.3	108.9

DICKINSON, N. DAK.

The yields of barley varieties grown at the Dickinson (N. Dak.) substation were obtained in cooperation with the North Dakota Agricultural Experiment Station. Results furnished for all of the 15 years from 1907 to 1921, inclusive, are reported in Table 40. Only one variety, Hanna (C. I. No. 203), was grown for the entire period. Five varieties were included for 14 years. A comparison is made between 10 well-known varieties in the summarized digest of the table. Hannchen (C. I. No. 531) gave the highest yields of the 10 varieties compared. Svanhals (C. I. No. 187) was almost as good as Hannchen. The average yield of Hanna (C. I. No. 203) was 97 per cent of that of Svanhals and Hannchen. Gatami (C. I. No. 575) was the best 6-rowed variety, but it was not so good as White Smyrna (C. I. No. 658), the lowest yielding 2-rowed sort in the comparison. Manchuria (C. I. No. 244) was not higher than sixth in yield. Since the tests at Dickinson cover a period of 15 years, the results are much more conclusive than those at Edgeley or Mandan. The best varieties at Dickinson are unquestionably 2-rowed sorts. At Lethbridge, Alberta, they were also superior. It would seem that the ecological conditions that favored this type of barley in southern Alberta obtain in western North Dakota.

TABLE 40.—*Annual acre yields of varieties of barley grown at the Dickinson (N. Dak.) substation in part or all of the 15 years from 1907 to 1921, inclusive*

[Data obtained in cooperation with the North Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)															Years grown	Average yield (bus.)	Percentage of weighted mean
		1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Nepal	595	40.9	22.1	24.1	23.0	8.4		20.9	12.5	41.5	29.6	11.1	9.7	0.2	38.0	5.7	14	20.5	83.0
Hanna	203	46.8	28.5	39.8	34.8	17.0	46.0	31.4	16.6	62.0	39.8	15.5	16.5	1.0	47.5	7.5	15	30.0	120.0
Gatami	575	36.7	31.4	27.9	34.5	11.9		27.5	24.3	39.7	29.6	10.7	22.2	4.9	39.6	7.3	14	24.9	100.8
Manchuria	244	16.5	27.9	30.2	28.0	7.8		30.6	16.3	49.3	32.5	9.7	14.9	3.2	41.5	6.8	14	22.5	91.1
Imperial	289	34.4	28.3	40.4													3	34.4	101.2
Oderbrucker	2700		22.1	30.0	23.5												3	25.2	78.7
Chevalier II	200		36.1	45.8													2	40.9	121.4
Primus	532		29.3	36.7	36.7	12.3	41.3	42.7	22.9	66.0	30.8	14.2					10	33.3	117.7
Hannchen	531		37.5	48.7	35.4	15.2	39.2	35.0	17.8	62.8	39.8	16.2	14.8	1.9	46.1	5.8	14	29.7	120.2
Princess	529		32.7	38.5										5.1	48.0	7.7	5	26.4	111.9
Svanhals	187		39.4	44.9	34.8	8.2		41.1	18.5	61.0	44.8	17.0	13.3	1.2	38.4	5.9	13	28.3	116.5
Coast	626				32.9	12.0	27.2	26.7									4	24.7	95.7
Famesh	616				14.7	3.5											2	9.1	43.3
Horsford	507				27.1												1	27.1	94.4
White Gatami	920				19.5									6.8	40.6	11.9	4	19.7	93.4
Proskowetz	893								13.5	61.7	39.4	14.5					4	32.3	117.9
White Smyrna	658								22.1	41.3	27.6	14.8	20.4	3.7	48.1	9.8	8	23.5	104.4
Oderbrucker	888								9.6								1	9.6	56.8
Chile Common	663								20.8	36.8	14.8	11.6	15.9	3.7	29.4	3.7	8	17.1	76.0
Manchuria	241								7.3								1	7.3	43.2
Steigum	907										30.1	15.9	23.6	3.1	47.8	9.5	6	21.7	109.6
Club Mariout	932										16.7	10.1	22.8	5.5	37.2	8.5	6	16.8	84.8
Wing Pedigree	1177												13.8	1.5	47.1	5.9	4	17.1	90.5
Scholey	962													6.3	51.4	8.6	3	22.1	115.1
Heil Hanna 4	677													6.1	45.6	7.2	3	19.6	102.1
White Smyrna	2169														50.6	10.3	2	30.5	118.2
Odessa	182														44.4	10.9	2	27.7	107.4
White Smyrna	2170														44.7	8.3	2	26.5	102.7

Summarized Digest, Showing the Relative Performance of 10 Representative Varieties

Variety	C. I. No.	Data shown	Varieties and percentages									
			Svanhals	Hanna	Hann-chen	Man-churia	Gatami	Chile Common	Club Mariout	White Smyrna	Nepal	Wing Pedigree
Svanhals	187	Years comparable	----------	13	13	13	13	8	6	8	13	4
		Percentage yield	----------	103.0	97.7	123.4	118.3	146.4	119.6	106.5	149.3	86.1
Hanna	203	Years comparable	13	----------	14	14	14	8	6	8	14	4
		Percentage yield	97.1	----------	97.0	128.4	116.2	151.0	126.8	109.9	140.7	106.1
Hannchen	531	Years comparable	13	14	----------	13	13	8	6	8	13	4
		Percentage yield	102.3	103.0	----------	126.2	121.0	150.1	123.6	109.3	152.8	100.4
Manchuria	244	Years comparable	13	14	13	----------	14	8	6	8	14	4
		Percentage yield	81.1	77.9	79.2	----------	90.5	127.4	107.7	92.8	109.6	97.2
Gatami	575	Years comparable	13	14	13	14	----------	8	6	8	14	4
		Percentage yield	84.5	86.0	82.6	110.5	----------	130.4	113.4	94.9	121.0	108.3
Chile Common	663	Years comparable	8	8	8	8	8	----------	6	8	8	4
		Percentage yield	68.3	66.2	66.6	78.5	76.7	----------	78.5	72.8	92.2	77.2
Club Mariout	932	Years comparable	6	6	6	6	6	6	----------	6	6	4
		Percentage yield	83.6	78.9	80.9	92.8	88.2	127.4	----------	81.0	106.9	108.3
White Smyrna	658	Years comparable	8	8	8	8	8	8	6	----------	8	4
		Percentage yield	93.9	91.0	91.5	107.8	105.3	137.4	123.4	----------	126.6	120.1
Nepal	595	Years comparable	13	14	13	14	14	8	6	8	----------	4
		Percentage yield	67.0	71.1	65.5	91.3	82.6	108.5	93.6	79.0	----------	78.5
Wing Pedigree	1177	Years comparable	4	4	4	4	4	4	4	4	4	----------
		Percentage yield	116.2	94.2	99.6	102.9	92.3	129.6	92.3	83.3	127.4	----------

TABLE 41.—*Annual acre yields of varieties of barley grown at the Williston (N. Dak.) substation in one or more of the 14 years from 1908 to 1921, inclusive*

[Data for the years 1908 to 1918, inclusive, obtained in cooperation with the North Dakota Agricultural Experiment Station, through whose courtesy data for 1920 and 1921 were furnished]

Variety	C. I. No.	Acre yields (bushels)													Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1920	1921			
Success	891	11. 3	46. 0	1. 2	8. 5	68. 3	26. 9	48. 5	73. 8	53. 7					9	37. 6	91. 9
Mansury	617	6. 4	56. 0	2. 0	8. 1	51. 2									5	24. 7	86. 4
Russian	2795	11. 3	57. 8	3. 9	4. 3	60. 6									5	27. 6	96. 5
Baxter	185	9. 8	51. 3	2. 6	8. 5	56. 9									5	25. 8	90. 2
Hanna	203	10. 0	56. 0	3. 9	10. 6	65. 8	19. 6	66. 7	80. 2	61. 7	23. 5	10. 2	13. 8	39. 2	13	35. 5	103. 5
Manchuria	241	12. 6	54. 5	6. 6	8. 2	68. 5	44. 8	53. 2	69. 2	56. 5					9	41. 6	101. 7
Silver King	890	12. 0	57. 2	4. 7	7. 7	63. 1	35. 4								6	30. 0	100. 7
Bernard	881	17. 1	52. 1	5. 7	9. 8	62. 9	40. 0	53. 9	64. 2						8	38. 2	97. 7
Manchuria	244	13. 7	51. 1	4. 7	8. 9	64. 0	37. 1	58. 7	72. 1	56. 3	26. 0	4. 2	10. 0		12	33. 9	98. 5
Highland Chief	883	10. 6	47. 8	2. 4	5. 5	66. 6	24. 0								6	26. 1	87. 6
Manchuria	882	18. 2	53. 7	6. 1	12. 3	65. 5	51. 3	71. 3	70. 2	54. 8	25. 0	6. 3	12. 5	32. 5	13	36. 9	107. 6
Nepal	595		41. 4	1. 7	8. 1	52. 1									4	25. 8	82. 2
Reed Triumph	889		46. 8	2. 2	5. 1	61. 5	51. 8								5	33. 5	103. 7
Oderbrucker	888		55. 6	3. 7	7. 7	61. 3	49. 8	52. 9	75. 8	58. 3	25. 4	3. 7	10. 0	45. 0	12	37. 4	104. 8
Gatami	575			7. 3	19. 5	59. 2		53. 2	72. 6	45. 2	25. 4	3. 0	10. 8	20. 8	10	31. 7	93. 0
Evans	892			4. 5	7. 2	45. 0									3	18. 9	73. 5
Canadian Thorpe	740					50. 0									1	50. 0	83. 3
Manchurian	739					58. 3	46. 3	76. 6	66. 7	58. 8	24. 4	3. 1	10. 0	27. 5	9	41. 3	100. 2
Himalaya	619						27. 2								1	27. 2	75. 1
Proskowetz	893						25. 8	54. 7	80. 0	63. 4	29. 8	10. 2	10. 8		7	39. 2	101. 0
Hannchen	531						26. 2	72. 9	83. 4	65. 9	24. 1	9. 0	10. 8	34. 2	8	40. 8	106. 8
Svanhals	187							53. 7	65. 5	52. 5	16. 7	8. 0	5. 6	31. 7	7	33. 4	86. 8
Primus	532							63. 6	75. 0	40. 4	20. 0	4. 6	5. 8	20. 8	7	32. 9	85. 5
Arnt	2741								67. 5	45. 4	15. 4				3	42. 8	83. 4
Flaxton	2742								75. 5						1	75. 5	104. 4
Krogstadt	2743								50. 2	36. 3					2	43. 3	68. 5
Tartar	1116								80. 0	68. 3	26. 9	8. 4			4	45. 9	112. 0
Tioga	2744									45. 9	21. 3				2	33. 6	84. 8
White Smyrna	658										20. 0	8. 3	12. 9		3	13. 7	103. 0
Wing Pedigree	1177											5. 2			1	5. 2	81. 3
Horsford	1271											5. 6	9. 6	36. 7	3	17. 3	117. 7
Oderbrucker	836												10. 8		1	10. 8	104. 9
Manchuria	2947													33. 3	1	33. 3	103. 4

Summarized Digest, Showing the Relative Performance of Eight Representative Varieties

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages							
			Primus	Svanhals	Hanna	Hann-chen	Man-churia	Gatami	Tartar	Nepal
Primus	532	Years comparable		7	7	7	7	7	4	(*)
		Percentage yield		98.5	78.0	76.7	84.4	99.7	76.3	
Svanhals	187	Years comparable	7		7	7	7	7	4	(*)
		Percentage yield	101.5		79.1	77.8	85.7	101.2	77.7	
Hanna	203	Years comparable	7	7		8	13	10	4	4
		Percentage yield	128.3	126.4		96.4	96.1	118.5	96.6	131.9
Hannchen	531	Years comparable	7	7	8		8	7	4	(*)
		Percentage yield	130.5	128.5	103.7		100.8	130.0	99.3	
Manchuria	882	Years comparable	7	7	18	8		10	4	4
		Percentage yield	118.4	116.6	104.0	99.2		112.5	85.1	133.2
Gatami	575	Years comparable	7	7	10	7	10		4	3
		Percentage yield	100.3	98.8	84.4	76.9	88.9		79.6	138.9
Tartar	1116	Years comparable	4	4	4	4	4	4		(*)
		Percentage yield	131.1	128.7	104.6	100.7	117.5	125.6		
Nepal	595	Years comparable	(*)	(*)	4	(*)	4	3	(*)	
		Percentage yield			75.8		75.1	72.0		

WILLISTON, N. DAK.

Varietal tests of barley were conducted at the Williston (N. Dak.) substation in cooperation with the North Dakota Agricultural Experiment Station from 1908 to 1918, inclusive. Records of yields of 1920 and 1921 were obtained through the courtesy of the North Dakota Agricultural Experiment Station. The annual yields are shown in Table 41. Four groups of barley were compared, of which the Manchuria and Hanna were practically equal in rank, while the Thorpe ranked higher than the Hull-less. In the summarized digest of Table 41 the yields of eight well-known varieties are compared. Tartar (C. I. No. 1116) produced slightly higher yields than Hannchen (C. I. No. 531). Yields practically equal to those of Tartar and Hannchen were obtained from Manchuria (C. I. No. 882). Hanna (C. I. No. 203) was fourth and Svanhals (C. I. No. 187) fifth in point of yield. Tartar (C. I. 1116) is a selection made from the same stock as Trebi (C. I. No. 936). Under irrigation in southern Idaho Trebi has proved to be a highly productive variety. Tartar has not been widely tested, and its value is not known. Disregarding the Tartar, it would seem that the Manchuria barleys were probably slightly superior to the 2-rowed sorts at Williston. This means that the line separating the districts where Manchuria is superior from that in which the 2-rowed barleys grow best runs in a northwesterly direction through North Dakota.

BROOKINGS, S. DAK.

Yields are reported in this bulletin from several stations in South Dakota. These data are available only for those years in which the work was carried on in cooperation at the various South Dakota stations or, in some cases, where the yields in other years have been published in bulletins of the State station. It is thought that the conclusions which are drawn from the results are not affected by the missing years.

In Table 42 yields are reported from a large number of varieties grown at Brookings in one or more of the years from 1902 to 1919, inclusive. To facilitate the study of the results six different groups of varieties were compared. The Manchuria was much superior to the other five groups. The Hanna, Chevalier, and Thorpe, in the order given, ranked next. The Coast group was not represented in this comparison, but probably would have been inferior to the four named.

In Table 42 the yields of 11 varieties representative of several different groups are compared. These are not necessarily the highest yielding ones of their groups. They are, however, well-known varieties which are of interest both because they are representative of a group and are widely grown. Of the 11 varieties compared the highest yield was obtained from Odessa (C. I. No. 182), which seems particularly adapted to eastern South Dakota. Manchuria (C. I. No. 241) was almost the equal of Odessa. The third variety in point of yield was Gatami (C. I. No. 575), which was tested in only a few years and was comparable with some of the varieties in only one year. Its place, therefore, is not conclusively determined. Following Gatami are three 2-rowed varieties of almost equal value. These are Gold (C. I. No. 1145), Svanhals (C. I. No. 187), and White Smyrna (C. I. No. 195). In recent years three selections have shown promise. These are Manchuria (C. I. No. 2156), Manchuria (C. I. No. 2155), and Odessa (C. I. No. 2154). Oderbrucker (C. I. No. 1146) also yielded well.

It is apparent from the original data (Table 42) and the summarized digest that barleys of the Manchuria type have produced the highest yields in eastern South Dakota. Odessa has given somewhat better yields than the best strains of either Manchuria or Oderbrucker. This variety belongs to the same general group as the Manchuria. Selections have been made from Odessa, however, which differ very much from the Manchuria barleys. Odessa (C. I. No. 182) as tested in South Dakota, while containing a few of these variant types, was of the same general character as Manchuria. The advantage of early ripening, which is so important in western South Dakota, was seen to have some influence even at Brookings, for both Gatami and White Smyrna gave fairly good yields. Nepal (C. I. No. 595) produced very low yields at Brookings but not much lower than at most points in the Mississippi Valley.

TABLE 42.—*Annual acre yields of varieties of barley grown at the South Dakota Agricultural Experiment Station (at Brookings) in one or more of the 18 years from 1902 to 1919, inclusive*

[Data obtained in cooperation with the South Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																	Years grown	Average yield (bus.)	Percentage of weighted mean
		1902	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919			
Chevalier	23	33.0	34.5																2	33.7	87.1
Hanna	24	34.7	47.0	60.6	46.4	19.2	30.1	14.6	19.2	0	25.2	35.4	38.5						12	30.9	96.0
Saale	25	37.8	44.5	39.0															3	40.4	104.9
Hanna	26	38.0	42.9	54.8	46.4	21.3	15.2												6	36.4	111.0
Bohemian	27	35.6	45.4	42.7	49.5	22.1	18.7					52.0	32.3	30.2					9	36.5	106.1
Hanna	28	40.4	46.6	46.2															3	44.4	115.3
Bestehorn Imperial	29	26.0	38.3																2	32.1	82.9
Hanna	30	33.8	45.0	43.5	44.0	20.2	22.0												6	34.7	105.8
Horn	31	28.6	44.7	31.0	41.4														4	36.4	93.8
Bohemian	32	39.0	47.7	35.4	44.4														4	41.6	107.2
Hanna	33	35.2	43.5	37.9	36.8														4	38.3	98.7
Do	34	28.6	47.5	38.5	41.7														4	39.1	100.8
Chevalier	35	31.3	42.9	64.2	50.3	22.5	27.8	15.4	11.0	.8	32.0	41.7							11	30.9	96.6
Mishima	45	10.4																	1	10.4	35.4
Striegum	47	22.3	42.5	30.0	43.1	20.8	13.9												6	28.8	87.8
Golden Melon	48	26.0	45.8	46.3	37.0	25.6	16.0												6	32.8	100.0
Nita	49	11.7																	1	11.7	39.8
Tanikaze	50	15.6																	1	15.6	53.1
Santaku	52	23.5	37.7	23.4															3	28.2	73.2
Shiro-Nishiki	54	29.9	36.6	39.3															3	35.3	91.7
Uyetake	56	52.0																	1	52.0	176.9
Nijo	60	36.5	34.6	35.4															3	35.5	92.2
Doitsu	62	39.0	56.6	26.9															3	40.8	106.0
Baitori	64	17.4																	1	17.4	59.2
Sangatsuka	78	22.0	27.9	32.9	31.2	21.3	13.3												6	24.8	75.6
Mocki-Mugi	80	20.8																	1	20.8	70.7
Beldi Dwarf	190	8.6	50.7	26.0								41.7	25.0	52.0					6	34.0	84.2
Black Smyrna	191	35.0	59.1	35.2															3	43.1	111.9
Telli	194	18.8	27.0																2	22.9	59.2
Hanna	203	45.0	47.0	48.3	49.0	23.3	14.7												6	37.9	115.5
Manchuria	244	29.7	46.8								47.2	64.8	53.2	61.4	43.7	45.8	56.3	21.9	10	47.1	119.2
Do	241	31.5	49.3	39.4	41.0	34.6	27.4	24.6	24.2	0	39.3	64.6		64.5					12	36.7	111.9
White Smyrna	195	31.5	56.6	33.3								45.4	45.6	33.3	31.6	33.2	57.3	14.6	10	38.2	97.9
Coreth	36		22.8	29.4															2	26.1	64.1
Nepal	22		29.0	41.3	25.3	12.0	8.8												5	23.3	70.4
Bavarian	158		54.6	49.5	40.2	21.0	19.5												5	37.0	111.8
Do	159		59.9	48.9	36.8	14.6	12.5												5	34.5	104.2
Mensury	170		48.5	29.1	45.8	33.1	31.8												5	37.7	113.9
Sidney	178		50.7	27.9	36.5	20.8													4	34.0	96.9

TABLE 42.—*Annual acre yields of varieties of barley grown at the South Dakota Agricultural Experiment Station (at Brookings) in one or more of the 18 years from 1902 to 1919, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)																	Years grown	Average yield (bus.)	Percentage of weighted mean
		1902	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919			
Odessa	182		61.2	42.5	50.5	32.1	26.0	26.3	27.7	.4	57.2	63.5	52.1	52.0	41.3	50.4	61.5	26.0	16	41.9	125.4
Common	184		45.5	44.0	42.5	31.7	24.7												5	37.7	113.9
Svanhals	187		69.0	45.0	49.1	23.8	24.5	17.5	12.5	.4	40.8	32.9							10	31.5	97.8
Chevalier II	200		49.7	57.3	48.9	20.4	21.1	18.7	11.7	2.3									8	28.8	92.0
Kitzing	201		44.2	46.3	44.6	21.0	13.5												5	33.9	102.4
Bohemian	204		52.0	55.0	48.0	16.3	17.5												5	37.8	114.2
Frankish	207		57.3	47.5	50.4	10.6	20.0												5	37.2	112.4
Highland Chief	209		56.0	42.5	42.3														3	46.9	116.7
Princess	529		51.8	46.3	39.3	12.3													4	37.4	106.6
Hannchen	531		50.0	57.7	49.4	22.7	15.8	11.5	14.4	1.0	39.1	40.2	36.5	39.2	17.7	24.1	45.8	.5	16	29.1	87.1
Primus	532		42.0	45.8	37.3	14.2	19.5												5	31.8	96.1
Tarumizu	55		18.9																1	18.9	41.4
Newton	172			27.9	35.4														2	31.7	81.7
Trooper	173			16.5															1	16.5	43.0
Summit	174			44.3	42.3	22.3	20.2												4	32.3	103.9
Nugent	176			36.5	28.3	7.5													3	24.1	72.8
Bolton	177			45.6	35.6	23.3	18.3												4	30.7	98.7
Victor	179			23.4	28.3														2	25.9	66.8
Danish Chevalier	180			40.4	28.0	9.4													3	25.9	78.2
Nepean	183			29.9	26.0														2	27.9	71.9
Baxter	185			39.1	29.9														2	34.5	88.9
Bohemian	188			33.9	33.9	8.5													3	25.4	76.7
Kitzing	189			54.7	53.8	22.9	39.3	15.2	24.8	.2	50.0	21.9							9	31.4	103.3
Olonets	198			44.3	40.4	21.0													3	35.2	106.3
Bavarian	208			42.9	39.0	17.3	10.1												4	27.3	87.8
Nepal	595			30.1	23.9	11.0	5.0					31.2	38.5	27.4	13.3	20.0	49.0	5.2	11	23.1	69.0
Baku	253			23.4															1	23.4	60.9
Himalaya	254			35.7	28.8	12.2													3	25.6	77.3
Fan	255			37.2	35.8	7.8													3	26.9	81.3
Black	256			35.2															1	35.2	91.7
Early Lapland	259			29.3	22.8														2	26.1	67.3
Crimean Hull-less	320			23.3															1	23.3	60.7
Himalaya	322			36.5	34.2	16.3													3	29.0	87.6
Perm	17			40.0	26.4														2	33.2	85.6
Do	20			52.1	38.4	26.4													3	39.0	117.8
Senbaku	46			47.2	51.4	19.2	16.2												4	33.5	107.7
Chevalier	156			44.2	36.8														2	40.5	104.4
Bavarian	160			49.2	36.3	12.9	7.2												4	26.4	84.9
Goldfoil	162			43.5	43.3	21.7	14.5												4	30.7	98.7

Purposco	165			33.8	36.4														2	35.1	90.5
Kitzing	167			34.4	43.5	19.2	13.6												4	27.7	89.1
Prize Prolific	169			39.8	41.7	14.0	14.1												4	27.4	88.1
Surprise	171			35.2	41.4	16.5	18.9	16.5	11.4	.3									7	20.0	68.3
Victoria	323			34.5	41.0	20.8													3	32.1	97.0
Jewel	324			31.9	32.2	8.5													3	24.2	73.1
Phoenix Von Thalen	325			35.2	38.1	16.6													3	30.0	90.6
Goldthorpe	327			24.7	26.7	1.6													3	17.7	53.5
Manchuria	329			36.5	46.2	23.8	27.7												4	33.5	107.7
Gambrinus	330			31.2	30.9	11.7													3	24.6	74.3
Bestehorn	331			35.8	37.8	19.5													3	31.0	93.7
Kaiser	332			30.6	32.9	10.7													3	24.7	74.6
Baku	333			21.0															1	21.0	62.5
Trifurcate Hull-less	334			14.5															1	14.5	37.8
Coeleste	335			36.8	30.9	9.5	5.3												4	20.6	66.2
Greek	336			38.4	47.3	31.0	28.1												4	36.2	116.4
Hofbrau	338			32.6	30.3	7.5													3	23.5	71.0
Sholey Chevalier	339			28.6	29.9	12.7													3	23.7	71.6
Fan	341			35.2	25.4	6.8													3	22.5	68.0
Italian	342			36.5	33.9	17.3													3	29.2	88.2
Moravian	343			50.1	54.3	24.4	23.9	18.7	10.6	.8									7	26.1	89.1
Voronezh	350			44.9	52.7	27.3													3	41.6	125.7
Orel	351			48.2	50.5	26.3													3	41.7	126.0
Nepal	352			24.0	22.1														2	23.1	59.5
Yenidje	205				43.3	24.6													2	33.9	113.0
Cheyney	326				29.3	6.2													2	17.7	59.0
Centre	368				47.9	16.3													2	32.1	107.0
Brasserie	384				55.0	23.3	16.2												3	31.5	113.7
Hanna	416				55.3	24.0	31.3												3	36.9	133.2
Catania	434				48.9	25.4													2	37.1	123.7
Aquila	442				39.7	16.6													2	28.1	93.7
Quitepec	468				35.5	27.0													2	31.3	104.3
Oderbrucker	1146											51.0	31.5	71.9	47.9	33.2	54.2	23.9	7	44.8	112.6
Manchuria	2617											51.0							1	51.0	112.8
Club Mariout	261											30.2							1	30.2	66.8
Coast	626											48.9	38.5	64.5					3	50.6	107.4
Gatami	575											47.9	48.9	71.9	36.4	33.2	79.2	16.7	7	47.7	119.8
Gold	1145											48.6	53.1	50.0	22.2	28.6	47.9	1.0	7	35.9	90.2
Giant	2794												37.5	24.1					2	30.8	63.9
Odessa	2158													64.5					1	64.5	119.9
Manchuria	2157													62.5					1	62.5	116.2
Odessa	2154													70.8	39.6	39.0	67.7	19.8	5	47.4	123.4
Manchuria	2156													75.0	50.0	40.1	63.5	27.1	5	51.1	133.1
White Gatami	920														31.9	33.2	56.3	15.6	4	34.3	100.9
Composite	1147														31.2				1	31.2	97.5
Horsford	507														14.6	32.1	50.0	17.7	4	28.6	84.1
Poppenheim	314														11.7	16.6	34.9	4.2	4	16.9	49.7
Manchuria	2155														46.9	37.8	56.3	25.0	4	41.5	122.1
Wing Pedigree	1177															25.5			1	25.5	77.5
Oderbrucker	1174																	32.3	1	32.3	192.3

TABLE 42.—*Annual acre yields of varieties of barley grown at the South Dakota Agricultural Experiment Station (at Brookings) in one or more of the 18 years from 1902 to 1919, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 11 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages										
			Chevalier	Primus	Svanhals	Bohemian	Hannchen	Manchuria	Odessa	Gatami	Gold	White Smyrna	Nepal
Chevalier	35	Years comparable	----------	5	10	7	10	11	10	1	1	4	5
		Percentage yield	----------	130.8	97.8	105.5	102.3	90.4	79.7	87.1	85.8	108.0	204.1
Primus	532	Years comparable	5	----------	5	5	5	5	5	(*)	(*)	2	4
		Percentage yield	76.5	----------	75.1	89.0	81.2	82.8	74.8	----------	----------	97.7	166.9
Svanhals	187	Years comparable	10	5	----------	6	10	10	10	1	1	3	5
		Percentage yield	102.2	133.1	----------	106.0	104.5	91.6	81.4	68.7	67.7	108.6	173.2
Bohemian	27	Years comparable	7	5	6	----------	8	8	8	3	3	6	7
		Percentage yield	94.8	112.3	94.3	----------	94.0	84.1	77.1	67.9	75.5	96.9	148.1
Hannchen	531	Years comparable	10	5	10	8	----------	11	16	7	7	9	11
		Percentage yield	97.8	123.2	95.7	106.4	----------	83.4	69.4	61.0	81.1	88.8	137.3
Manchuria	241	Years comparable	11	5	10	8	11	----------	11	2	2	5	6
		Percentage yield	110.6	120.7	109.2	118.9	119.9	----------	93.1	107.8	130.9	124.6	211.1
Odessa	182	Years comparable	10	5	10	8	16	11	----------	7	7	9	11
		Percentage yield	125.5	133.7	122.8	129.7	144.1	107.5	----------	103.8	137.9	128.4	195.6
Gatami	575	Years comparable	1	(*)	1	3	7	2	7	----------	7	7	7
		Percentage yield	114.9	----------	145.6	147.3	163.8	92.8	96.4	----------	132.9	128.0	181.0
Gold	1145	Years comparable	1	(*)	1	3	7	2	7	7	----------	7	7
		Percentage yield	116.5	----------	147.7	132.5	123.2	76.4	72.5	75.2	----------	96.3	136.2
White Smyrna	195	Years comparable	4	2	3	6	9	5	9	7	7	----------	8
		Percentage yield	92.6	102.4	92.1	103.1	112.6	80.3	77.9	78.1	103.8	----------	137.1
Nepal	595	Years comparable	5	4	5	7	11	6	11	7	7	8	----------
		Percentage yield	49.0	59.9	57.7	67.5	72.8	47.4	51.1	55.2	73.4	73.0	----------

EUREKA, S. DAK.

Tests of barley varieties were carried on at the substation at Eureka, S. Dak., in cooperation with the South Dakota Agricultural Experiment Station for 11 years, 1909 to 1919, inclusive. In at least two of the years 1909, 1910, and 1911 17 varieties were tested (Table 43). The yields for 1909 were very good. The crop of 1911 was a total failure. Only three varieties were tested for more than five years. In four of the seven years in which Gatami (C. I. No. 575) and Hannchen (C. I. No. 531) were both grown Hannchen was superior to Gatami. Gatami excelled Manchuria (C. I. No. 244) in four of the seven comparable years. Under favorable seasonal conditions, however, Manchuria produced much more than Gatami, so that the average production of Manchuria for the seven years was greater than that of Gatami. White Smyrna (C. I. No. 195) was better than Hannchen in two out of four comparable years and exceeded Manchuria in all of them, but these were not favorable years. Odessa (C. I. No. 182), which was also grown four years, was better than Manchuria in two of these years and superior to Hannchen in three of them. White Smyrna, comparable with Odessa for only three years, exceeded it in two of the three.

Eureka is in a district where there is a high premium on early maturity. In years of adequate rainfall barleys of the Manchuria type produced good yields. The conditions which were favorable to the 2-rowed barleys in western North Dakota obviously extended into South Dakota. This is reflected in the high yield of Hannchen. In years of low yield, that is, in years of low rainfall, such varieties as White Smyrna and Gatami are most likely to produce grain. It is entirely possible that even a small return in these years may be more valuable than a higher return from other varieties in the good years. The early-season varieties are more likely to produce feed in all years.

TABLE 43.—*Annual acre yields of varieties of barley grown at the Eureka (S. Dak.) substation in some of the 11 years from 1909 to 1919, inclusive*

[Data obtained in cooperation with the South Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)											Years grown	Average yield (bus.)	Percentage of weighted mean
		1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919			
Manchuria	241	30.9	5.1	0	-----	-----	-----	-----	-----	-----	-----	-----	3	12.0	122.4
Do	244	31.2	6.0	0	2.6	6.4	22.8	60.1	43.2	27.0	0.6	14.3	11	19.5	139.3
Oderbrucker	1146	33.3	2.7	0	-----	-----	-----	-----	-----	-----	-----	-----	3	12.0	122.4
Odessa	182	29.5	5.2	0	-----	-----	-----	-----	-----	-----	1.0	18.9	5	10.9	112.4
Bohemian	27	32.1	8.0	0	-----	-----	-----	-----	-----	-----	-----	-----	3	13.4	136.7
Chevalier II	200	31.0	.3	0	-----	-----	-----	-----	-----	-----	-----	-----	3	10.4	106.1
Golden Melon	48	26.2	1.3	0	-----	-----	-----	-----	-----	-----	-----	-----	3	9.2	93.9
Hanna	24	18.7	4.3	0	-----	-----	-----	-----	-----	-----	-----	-----	3	7.7	78.6
Do	34	23.1	3.3	0	-----	-----	-----	-----	-----	-----	-----	-----	3	8.8	89.8
Do	203	18.7	3.1	0	-----	-----	-----	-----	-----	-----	-----	-----	3	7.3	74.5
Hannchen	531	29.6	3.8	0	21.4	16.5	30.5	67.5	33.0	32.2	.7	17.8	11	23.0	164.3
Horn	31	27.5	12.2	0	-----	-----	-----	-----	-----	-----	-----	-----	3	13.2	134.7
Primus	532	18.7	1.7	0	-----	-----	-----	-----	-----	-----	-----	-----	3	6.8	69.4
Princess	529	28.3	0	0	-----	-----	-----	-----	-----	-----	-----	-----	3	9.4	95.9
Striegum	47	27.1	3.9	0	-----	-----	-----	-----	-----	-----	-----	-----	3	10.3	105.1
Gatami	575	-----	7.3	0	23.4	11.4	30.9	39.2	16.8	19.6	-----	-----	8	18.6	167.6
White Smyrna	195	-----	7.2	0	7.8	-----	-----	-----	-----	-----	2.9	16.3	5	6.8	154.5

TABLE 44.—*Annual acre yields of varieties of barley grown at the Highmore (S. Dak.) substation in part or all of the 17 years from 1903 to 1919, inclusive*

[Data obtained in cooperation with the South Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)																	Years grown	Average yield (bus.)	Percentage of weighted mean
		1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919			
Manchuria	241	27.5	16.8	37.7	43.3	22.7	24.4	14.6	8.1	0.1									9	21.7	100.5
Bestehorn Imperial	29	12.3	10.0																2	11.1	72.1
White Smyrna	195	16.6	16.6	45.4	30.4	19.6	29.8	19.6	14.0	0	8.6	10.8	37.9	60.3	41.6	30.2	26.0	26.7	17	25.5	103.7
Black Smyrna	191	24.5	22.3	40.8															3	29.2	113.2
Bohemian	27	16.5	12.3	46.8	31.3	27.7	38.4	20.8	19.2	0		1.3	33.8	74.9					12	26.9	109.8
Do	32	18.3	10.4	54.1	32.7	21.7	30.0	17.3	11.5										8	24.5	102.1
Chevalier	23	12.1	11.0																2	11.5	74.7
Do	35	16.5	14.7	45.6															3	25.6	99.2
Doitsu	62	12.1	20.8	36.6															3	23.2	89.9
Golden Melon	48	10.6	10.4	51.0	28.5	20.8	26.4	11.5											7	22.7	88.3
Hanna	24	19.4	17.5	50.6	36.8	22.9	34.6	15.6	13.3	0	.4	2.1	39.0	64.5					13	24.4	106.6
Do	26	15.8	16.5	45.0															3	25.8	100.0
Do	28	15.6	10.8	46.0															3	24.1	93.4
Do	30	13.1	23.5																2	18.3	118.8
Do	33	12.3	15.4																2	13.9	90.3
Do	34	15.6	11.0	51.6	32.5	21.5	35.2	18.8	16.7	0	.2								10	20.3	102.0
Do	203	14.4	15.2	53.5	30.4	21.5	35.2	19.6	14.0										8	25.5	106.3
Horn	31	11.4	12.7	54.4	25.4	21.5	28.1	15.4											7	24.6	95.7
Rokaku Chevalier	39	15.8																	1	15.8	99.4
Striegum	47	15.6	13.1	47.9	25.4	18.6	32.1	14.2											7	23.8	92.6
Saale	25			42.7															1	42.7	92.8
Hannchen	531			41.8	56.8	26.0	29.0	15.8	14.6	0	.2	3.1	56.1	64.6	40.0	23.4	21.9	25.8	15	27.9	106.5
Chevalier II	200			48.5	50.6	25.2	22.9	14.8	15.4	0	.2								8	22.2	104.7
Primus	532			40.0	36.4	27.3	22.0	9.8											5	27.1	89.1
Princess	529			40.8	47.9	22.7	18.8	11.0	10.1	0	.2								8	18.9	89.1
Manchuria	214					22.7	27.7	15.8	14.6	0	.2	.8	30.0	68.6	38.9	29.7	14.6	23.7	13	22.1	94.4
Odessa	182					23.8	32.3	15.8	7.5	0	2.1	6.9	47.9	79.0	54.2	33.8	30.2	40.6	13	28.8	123.1
Oderbrucker	1146						28.3	15.6	10.8	0	.5								5	11.0	88.7
Beldi Dwarf	190								12.3	0	6.9	4.8	26.2						5	10.0	87.7
Coast	626								8.3	0	3.9	7.3	44.8	79.0	45.1	30.7	22.9	31.3	10	27.3	115.2
Manchuria	2617								14.0	0	.9								3	5.0	92.6
Club Mariout	261								15.6	0	5.5	4.8	36.4	49.9					6	18.7	97.9
Gatami	575								8.0	0	8.6	5.0	48.9	65.9	42.3	34.1	20.8	28.9	10	26.3	111.0
Composite	1147										.3	3.1	29.1	60.3	42.4				5	27.0	89.4
Gold	1145											.8	34.3	72.8	35.4				4	35.8	95.0
Coast	691												39.8	39.8	64.5				3	48.0	101.9
Arlington Awnless	702												32.3	43.7					2	38.0	75.4
Odessa	2154														39.2				1	39.2	94.5
Do	2168														43.7				1	43.7	105.3

White Gatami	920	------	------	------	------	------	------	------	------	------	------	------	------	------	43.1	34.3	23.1	26.0	4	31.6	102.7
Caucasian	714	------	------	------	------	------	------	------	------	------	------	------	------	------	43.7	------	------	------	1	43.7	105.3
Franconian	679	------	------	------	------	------	------	------	------	------	------	------	------	------	39.9	22.4	14.1	15.9	4	23.1	75.0
Poppenheim	314	------	------	------	------	------	------	------	------	------	------	------	------	------	18.3	13.7	17.7	21.4	4	17.8	57.8
Horsford	507	------	------	------	------	------	------	------	------	------	------	------	------	------	31.9	22.6	13.0	22.9	4	22.6	73.4
Wing Pedigree	1177	------	------	------	------	------	------	------	------	------	------	------	------	------	------	24.7	19.8	22.4	3	22.3	83.8
White Smyrna	2169	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	29.7	39.6	2	34.7	131.4
Do	2170	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	39.1	35.1	2	37.1	140.5
Do	2171	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	36.5	34.0	2	35.3	133.7
Do	2172	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	34.9	32.6	2	33.7	127.7

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 11 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages										
			Golden Melon	Bohemian	Hannchen	Manchuria	Odessa	Gatami	Coast	Club Mariout	White Smyrna	Beldi Dwarf	Horsford
Golden Melon	48	Years comparable	------	7	5	3	3	(*)	(*)	(*)	7	(*)	(*)
		Percentage yield	------	82.1	81.6	88.7	81.6	------	------	------	89.4	------	------
Bohemian	27	Years comparable	7	------	10	8	8	5	5	5	12	4	(*)
		Percentage yield	121.7	------	95.6	119.9	101.4	101.1	92.7	121.1	107.3	125.4	------
Hannchen	531	Years comparable	5	10	------	13	13	10	10	6	15	5	4
		Percentage yield	122.6	104.6	------	111.6	85.7	95.1	91.4	123.5	104.5	147.4	122.9
Manchuria	244	Years comparable	3	8	13	------	13	10	10	6	13	5	4
		Percentage yield	112.8	83.4	89.6	------	76.8	84.2	80.9	101.8	88.4	90.8	118.3
Odessa	182	Years comparable	3	8	13	13	------	10	10	6	13	5	4
		Percentage yield	122.5	98.7	116.7	130.2	------	115.1	110.6	127.8	115.1	128.3	175.7
Gatami	575	Years comparable	(*)	5	10	10	10	------	10	6	10	5	4
		Percentage yield	------	98.9	105.1	118.7	86.7	------	96.0	121.6	102.5	140.4	139.5
Coast	626	Years comparable	(*)	5	10	10	10	10	------	6	10	5	4
		Percentage yield	------	107.9	109.3	123.6	90.4	104.1	------	127.7	106.7	128.1	143.8
Club Mariout	261	Years comparable	(*)	5	6	6	6	6	6	------	6	5	(*)
		Percentage yield	------	82.6	81.0	98.2	78.2	82.3	78.3	------	85.3	124.1	------
White Smyrna	195	Years comparable	7	12	15	13	13	10	10	6	------	5	4
		Percentage yield	111.8	93.2	95.7	113.2	86.9	97.6	93.7	117.3	------	142.0	137.7
Beldi Dwarf	190	Years comparable	(*)	4	5	5	5	5	5	5	5	------	(*)
		Percentage yield	------	79.7	67.8	110.1	78.0	71.2	78.1	80.6	70.4	------	------
Horsford	507	Years comparable	(*)	(*)	4	4	4	4	4	(*)	4	(*)	------
		Percentage yield	------	------	81.4	84.6	56.9	71.7	69.5	------	72.6	------	------

HIGHMORE, S. DAK.

The yields of barley varieties grown at Highmore, S. Dak., in cooperation with the South Dakota Agricultural Experiment Station, from 1903 to 1919, inclusive, are reported in Table 44. Eleven representative varieties are compared in the summarized digest of the same table. Odessa (C. I. No. 182) was the highest yielding sort. It was also the best of the varieties compared at Brookings. Second in point of yield was Coast (C. I. No. 626). Bohemian (C. I. No. 27), a representative of the Hanna group, was third in rank. This variety, however, was dropped from the experiment in 1915, thus making it comparable with a number of the varieties for only the last four or five years it was grown. The crops in two of these years were almost complete failures owing to drought. The rank of Bohemian is not so conclusive as that of the other varieties. Following it is Gatami (C. I. No. 575). Although this barley came from the same general region in which Manchuria originated it ripens somewhat earlier, thus making it more drought escaping.

While the 2-rowed varieties Hannchen (C. I. No. 531) and White Smyrna (C. I. No. 195) do not rank relatively so high as those just mentioned, they were included in the experiment for a longer period than any of the other varieties tested and have produced uniformly good yields with the exception of the three years of drought, 1911, 1912, and 1913. In 1911 no yields were obtained from any of the varieties with the exception of Manchuria (C. I. No. 241), which produced only 0.1 bushel. In 1912 and 1913 White Smyrna exceeded all of the other sorts in yield. Manchuria (C. I. No. 244) was very low in rank, being superior only to Golden Melon (C. I. No. 48), Club Mariout (C. I. No. 261), and Horsford (C. I. No. 507). In 1918 and 1919 four promising selections of White Smyrna were grown. They were exceeded only by Odessa (C. I. No. 182).

It is apparent that in moving westward in South Dakota, while Odessa holds its position of prominence, barleys of the Manchuria group are no longer among the better yielding varieties. They are superseded by Coast, Gatami, and the 2-rowed types.

COTTONWOOD, S. DAK.

Barleys were grown at the Cottonwood (S. Dak.) substation, in cooperation with the South Dakota Agricultural Experiment Station from 1909 to 1919, inclusive. The yields during this period are reported in Table 45. The relative values of the varieties are difficult to determine. Many of them were tested for only one or two years, and these were years of drought. Four varieties are comparable for the years 1916 to 1919, inclusive. Of these, Odessa (C. I. No. 182) produced the highest yield, White Smyrna (C. I. No. 195) was second, while Gatami (C. I. No. 575) and Hannchen (C. I. No. 531) were third and fourth, respectively. Here, again, it will be noted that two varieties characterized by early ripening yielded well. Odessa, which was the best sort at Brookings for many years, was slightly better than the two early-season varieties. White Smyrna and Hannchen have given good results from Highmore north and west over a considerable area.

TABLE 45.—*Annual acre yields of varieties of barley grown at the Cottonwood (S. Dak.) substation in one or more of the 11 years from 1909 to 1919, inclusive*

[Data obtained in cooperation with the South Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)										Years grown	Average yield (bus.)	Percentage of weighted mean
		1909	1910	1912	1913	1914	1915	1916	1917	1918	1919			
Manchuria	241	1.0	2.0	-----	-----	-----	-----	-----	-----	-----	-----	2	1.5	53.6
Do	244	2.0	3.1	2.6	0.4	1.3	-----	19.9	0.3	-----	-----	7	4.2	68.9
Oderbrucker	1146	2.2	3.1	-----	-----	-----	-----	-----	-----	-----	-----	2	2.7	96.4
Bohemian	32	3.9	1.6	-----	-----	-----	-----	-----	-----	-----	-----	2	2.7	96.4
Chevalier II	200	3.4	2.9	-----	-----	-----	-----	-----	-----	-----	-----	2	3.1	110.7
Hanna	34	2.8	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	2.8	93.3
Do	24	2.4	3.5	-----	-----	-----	-----	-----	-----	-----	-----	2	2.9	103.6
Do	203	1.6	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	1.6	53.3
Hannchen	531	6.1	3.5	-----	-----	3.1	8.6	18.5	10.0	17.7	24.4	8	11.5	111.7
Horn	31	4.9	2.2	-----	-----	-----	-----	-----	-----	-----	-----	2	3.5	125.0
Golden Melon	48	-----	1.2	-----	-----	-----	-----	-----	-----	-----	-----	1	1.2	46.1
Gatami	575	-----	-----	-----	-----	6.6	-----	19.9	5.4	25.0	23.9	5	16.2	94.7
Odessa	182	-----	-----	-----	-----	-----	-----	25.8	11.6	27.8	37.3	4	25.6	132.6
White Smyrna	195	-----	-----	-----	-----	-----	-----	19.4	10.5	25.2	25.4	4	20.1	104.1

NEWELL, S. DAK.

Dry-land conditions.—The yields of barley varieties grown on dry land at the Belle Fourche Experiment Farm, Newell, S. Dak., were obtained in cooperation with the Office of Western Irrigation Agriculture. These yields for the years 1908 to 1919, inclusive, are shown in Table 46. Ten varieties representing different types and groups are compared in the summarized digest of Table 46. The highest yields were obtained from White Smyrna (C. I. No. 658) and Hannchen (C. I. No. 531). Coast (C. I. No. 690), which was grown only during the last five years of the experiment, was not comparable with Chevalier II (C. I. No. 200) or Hanna (C. I. No. 24). It was superior, however, to the other five of the ten varieties. Odessa (C. I. No. 182), Gatami (C. I. No. 575), and Manchuria (C. I. No. 241) follow in the order named. Here again the results confirm the conclusions that in the western two-thirds of South Dakota the 2-rowed barleys are equal or superior to the 6-rowed sorts. At Newell under dry-land conditions all other varieties are surpassed by the 2-rowed varieties Hannchen and White Smyrna.

TABLE 46.—*Annual acre yields of varieties of barley grown on dry land at the Belle Fourche (Newell, S. Dak.) Experiment Farm in part or all of the 12 years from 1908 to 1919, inclusive*

[Data obtained in cooperation with the South Dakota Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919			
Manchuria	244	26.0	17.3	4.3	0	7.4	6.6	----	----	----	----	----	----	6	10.3	115.7
Nepal	262	16.3	9.6	2.5	0	----	----	----	----	----	----	----	----	4	7.1	74.7
Do	595	12.0	9.0	1.7	0	10.7	8.9	4.9	50.8	13.1	9.5	8.7	2.0	12	10.9	67.3
Hanna	24	29.0	23.8	1.0	0	0	10.7	2.7	----	----	----	----	----	7	9.6	114.3
Do	203	27.9	21.4	1.4	0	0	----	----	----	----	----	----	----	5	10.1	114.8
Manchuria	241	----	19.8	5.2	0	8.1	8.0	4.2	62.1	20.2	12.9	18.3	9.0	11	15.3	96.8
Odessa	182	----	22.1	8.1	0	9.8	8.7	3.5	69.4	26.1	18.3	20.0	8.0	11	17.6	111.4
Chevalier II	200	----	22.1	0	0	0	6.8	1.1	----	----	----	----	----	6	5.0	70.4
Hannchen	531	----	19.2	3.1	0	0	12.7	6.7	85.9	23.5	17.5	23.6	6.1	11	18.0	113.9
White Smyrna	658	----	----	----	----	10.7	14.3	14.4	76.2	24.6	23.3	18.4	9.2	8	23.9	123.8
Gatami	575	----	----	----	----	18.3	8.2	6.9	50.6	28.2	26.0	14.4	7.1	8	20.0	103.6
Coast	690	----	----	----	----	----	----	----	82.8	18.3	22.1	18.4	9.8	5	30.3	111.0
Himalaya	620	----	----	----	----	----	----	----	58.4	18.3	12.4	12.7	5.4	5	21.4	78.4
White Smyrna	195	----	----	----	----	----	----	----	77.9	----	----	----	----	1	77.9	114.2

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			Chevalier II	Hanna	Hannchen	Manchuria	Odessa	Gatami	Coast	White Smyrna	Nepal	Himalaya
Chevalier II	200	Years comparable	------	6	6	6	6	3	(*)	3	6	(*)
		Percentage yield	------	78.5	71.9	66.2	57.5	23.7	------	20.1	85.2	------
Hanna	24	Years comparable	6	------	6	6	6	3	(*)	3	7	(*)
		Percentage yield	127.3	------	91.6	84.3	73.2	40.1	------	34.0	142.4	------
Hannchen	531	Years comparable	6	6	------	11	11	8	5	8	11	5
		Percentage yield	139.0	109.2	------	118.2	102.2	110.2	103.4	92.1	166.2	146.1
Manchuria	241	Years comparable	6	6	11	------	11	8	5	8	11	5
		Percentage yield	151.0	118.6	84.6	------	86.5	89.4	80.9	74.7	149.7	114.3
Odessa	182	Years comparable	6	6	11	11	------	8	5	8	11	5
		Percentage yield	174.0	136.6	97.8	115.6	------	102.6	93.7	85.7	162.6	132.3
Gatami	575	Years comparable	3	3	8	8	8	------	5	8	8	5
		Percentage yield	422.8	249.3	90.7	111.8	97.5	------	83.4	83.6	147.1	117.8
Coast	690	Years comparable	(*)	(*)	5	5	5	5	------	5	5	5
		Percentage yield	------	------	96.7	123.6	106.8	119.9	------	99.8	180.0	141.2
White Smyrna	658	Years comparable	3	3	8	8	8	8	5	------	8	5
		Percentage yield	498.7	294.0	108.6	133.8	115.7	119.7	100.2	------	176.0	141.5
Nepal	595	Years comparable	6	7	11	11	11	8	5	8	------	5
		Percentage yield	117.3	70.2	60.2	71.1	61.5	68.0	55.5	56.8	------	78.5
Himalaya	620	Years comparable	(*)	(*)	5	5	5	5	5	5	5	------
		Percentage yield	------	------	68.5	87.5	75.6	84.9	70.8	70.7	127.5	------

Irrigated land.—Barleys were grown under irrigation at the Belle Fourche Experiment Farm, Newell, S. Dak., in cooperation with the Office of Western Irrigation Agriculture from 1912 to 1921, inclusive. The yields of the 12 varieties tested during this period are presented in Table 47. Seven of these were grown for more than three years. This table shows that the 2-rowed varieties are high-yielding sorts under irrigation at Newell, as they also were under dry-land conditions there. Hannchen (C. I. No. 531) was surpassed by Chevalier II (C. I. No. 200) for the seven comparable years in which they were grown. Coast (C. I. No. 690), which was tested for 6 of the 10 years of the experiment, was excelled by both Chevalier II and Hannchen. Trebi (C. I. No. 936) produced the highest average yield of all varieties during the period from 1917 to 1921, inclusive. This has been a very productive variety at rather high altitudes under irrigation in the West. White Smyrna (C. I. No. 195), which was the highest yielding sort on dry land here, was tested only in 1921, when it gave but a fair return.

TABLE 47.—*Annual acre yield of varieties of barley grown on irrigated land at the Belle Fourche (Newell, S. Dak.) Experiment Farm in one or more of the 10 years from 1912 to 1921, inclusive*

[Data obtained in cooperation with the South Dakota Agricultural Experiment Station from 1912 to 1919, inclusive. Data for 1920 and 1921 used by courtesy of the Office of Western Irrigation Agriculture]

Variety	C.I. No.	Acre yields (bushels)										Years grown	Average yield (bus.)	Percentage of weighted mean
		1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Manchuria	241	16.9	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	16.9	111.2
Odessa	182	17.4	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	17.4	114.5
Chevalier II	200	13.0	-----	23.0	39.2	23.9	38.5	74.3	32.0	25.0	15.4	9	31.6	111.7
Hannchen	531	19.8	32.9	15.0	-----	25.1	40.7	66.9	27.8	-----	10.4	8	29.8	105.3
Nepal	595	9.1	-----	19.2	20.4	14.9	22.4	51.6	18.4	-----	-----	7	22.3	74.1
Silver King	905	-----	25.8	21.8	20.9	14.7	23.9	66.7	17.7	-----	-----	7	27.3	86.4
Manchuria	244	-----	23.5	17.8	-----	-----	-----	-----	-----	-----	-----	2	20.7	88.1
Chevalier	1142	-----	-----	26.8	37.2	23.2	-----	-----	-----	-----	-----	3	29.1	128.8
Himalaya	620	-----	-----	29.6	23.4	17.5	23.7	62.7	17.5	-----	-----	6	29.1	91.2
Coast	690	-----	-----	-----	23.0	15.2	37.9	65.6	25.4	-----	7.1	6	29.0	93.2
Trebi	936	-----	-----	-----	-----	-----	38.0	75.9	28.8	34.6	12.8	5	38.0	109.2
White Smyrna	195	-----	-----	-----	-----	-----	-----	-----	-----	-----	11.7	1	11.7	101.7

LINCOLN, NEBR.

Results of the varietal experiments at Lincoln, Nebr., were obtained through the courtesy of the Nebraska Agricultural Experiment Station and are presented in Table 48. Barley experiments were conducted at three distinct periods, in 1900 and 1901, from 1905 to 1912, inclusive, and from 1917 to 1921, inclusive. Three varieties were tested for both years in the first period. Of these, Black Hull-less (C. I. No. 596) produced the highest average, with Russian Naked (C. I. No. 2815) second and Sisolsk (C. I. No. 89) third. This latter variety was originally grown in the extremely cold regions of northern Russia, so it is not surprising that it was surpassed by these hull-less sorts, even though they are low-yielding barleys.

Eight varieties were grown in the second period, among which Black Hull-less and Russian Naked again appear. These two barleys were grown in the years 1908 to 1910, inclusive. Black Hull-less was still the better of the two, although they were both surpassed by Oderbrucker (C. I. No. 1517). This latter variety was grown for four years, 1907 to 1910, inclusive, producing an average yield of 135 per cent of the weighted mean. Tennessee Winter (C. I. No. 257) was the only variety grown in all the eight years of the second period. It produced very high yields for the first four years but was a complete failure during the last four. The winters are usually too severe for the successful cultivation of winter barley in Nebraska. Four varieties from an English seed firm were introduced in 1909. None of these seemed promising, and with the exception of Garton (C. I. No. 2816), which was grown again in 1910, they were dropped from the experiment.

TABLE 48.—*Annual acre yields of varieties of barley grown at the Nebraska Agricultural Experiment Station (at Lincoln) in one or more of the 22 years from 1900 to 1921, inclusive*

[Data obtained through the courtesy of the Nebraska Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)															Years grown	Average yield (bus.)	Percentage of weighted mean
		1900	1901	1905	1906	1907	1908	1909	1910	1911	1912	1917	1918	1919	1920	1921			
Sisolsk	89	18.9	3.5														2	11.2	84.8
Black Hull-less	596	25.4	4.0				28.9	31.9	44.5								5	27.5	110.4
Russian Naked	2815	23.8	3.7				14.9	24.0	33.7								5	20.0	80.3
Tennessee Winter	257			58.5	65.3	68.0	49.4	0	0	0	0						8	30.1	95.6
Oderbrucker	1517					41.1	39.6	44.3	46.6								4	42.9	135.3
Garton 5004	2816							27.5	44.5								2	36.0	130.0
Garton 5003	2817							25.5									1	25.5	107.1
Garton 5002	2818							17.6									1	17.6	73.9
Garton 5001	2819							16.8									1	16.8	70.6
Manchuria	2820											57.7	0	19.8	47.9	18.6	5	28.8	92.3
Do	1580											53.1	0	15.2	41.5	19.5	5	25.9	83.0
Gold	1145											61.2	0				2	30.6	106.6
Manchuria	2330													18.5	49.5	19.8	3	29.3	92.7
Club Mariout	261														60.7	23.9	2	42.3	128.6
Ace	1853														49.8	24.3	2	37.1	112.8
O. A. C. 21	1470														49.4	22.3	2	35.9	109.1
Odessa	182														48.5	19.3	2	33.9	103.0
Gatami	575														45.5	16.2	2	30.9	93.9
Oderbrucker	1529														44.5	19.2	2	31.9	97.0
Svanhals	187														43.7	26.7	2	35.2	107.0
White Smyrna	195														41.7	29.5	2	35.6	108.2
Chevalier	1886														40.0	20.4	2	30.2	91.8
Wing Pedigree	1177														35.3	21.5	2	28.4	86.3
Horsford	507														33.5	20.0	2	21.7	66.0
Hannchen	531														29.2	27.5	2	28.3	86.0
Manchuria	1562														42.9	20.0	2	31.5	95.7

Two varieties, Manchuria (C. I. Nos. 1580 and 2820), were grown for the full five years of the third period. In 1917 they were both surpassed by Gold (C. I. No. 1145). All three of these were complete failures in 1918, and Gold was not grown again. In 1919 Manchuria (C. I. No. 2330), a pedigreed sort, was introduced and was continued through 1921. These three Manchuria barleys, however, were surpassed by a number of varieties grown only in 1920 and 1921. Club Mariout (C. I. No. 261), a North African barley, produced the highest average yield, 42.3 bushels, for those years. Ace (C. I. No. 1853) was second in point of yield. This is a 2-rowed variety of the Smyrna type. Following Ace is O. A. C. 21 (C. I. No. 1470), another Manchuria barley. Fourth and fifth in rank are two 2-rowed sorts, White Smyrna (C. I. No. 195) and Svanhals (C. I. No. 187).

From the results of these three periods it is rather difficult to say which types are best adapted here. From the yields in recent years Lincoln appears to be on the border between the districts where the barleys of the Manchuria group and those of the North African and Asia Minor groups can be successfully grown.

Table 49.—*Annual acre yields of varieties of barley grown at the North Platte (Nebr.) substation in one or more of the 13 years from 1909 to 1921, inclusive*

[Data obtained through the courtesy of the Nebraska Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1909	1910	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Coast	690	19.0	7.9	14.7	6.3	11.4	29.7	58.6	25.5	12.0	25.5	40.3	11.3	12	21.9	107.4
Manchuria	244	19.2	4.4	----	----	----	----	----	----	----	----	----	----	2	11.8	106.3
Black Hull-less	596	18.6	4.6	14.0	----	----	----	----	----	----	----	----	----	3	12.4	108.8
Hanna	24	14.8	----	----	.8	3.5	----	----	----	----	----	----	----	3	6.4	61.5
Beardless	639	15.2	5.4	8.5	1.0	8.4	30.0	----	----	----	----	----	----	6	11.4	88.4
Nepal	595	9.2	4.3	----	----	----	----	----	----	----	----	----	----	2	6.7	60.4
Stavropol	2103	----	----	----	5.2	15.0	27.8	58.2	29.1	12.0	23.4	39.0	10.3	9	24.4	106.5
Wisconsin Pedigree	835	----	----	----	----	8.7	30.6	54.2	24.4	5.5	21.1	27.3	10.3	8	22.8	93.1
Horsford	877	----	----	----	----	----	22.7	38.9	24.7	10.1	20.7	36.7	9.2	7	23.3	88.6
White Smyrna	658	----	----	----	----	----	----	66.6	28.5	12.2	23.1	36.4	7.7	6	29.1	111.5
Gatami	575	----	----	----	----	----	----	----	----	----	18.4	24.9	----	2	21.7	71.9
Trebi	936	----	----	----	----	----	----	----	----	----	----	45.2	10.9	2	28.1	120.6
McClymont	2126	----	----	----	----	----	----	----	----	----	----	41.3	11.2	2	26.3	112.9
Manchuria	2330	----	----	----	----	----	----	----	----	----	----	----	10.2	1	10.2	101.0

NORTH PLATTE, NEBR.

Through the courtesy of the Nebraska Agricultural Experiment Station the records of barley yields for the years 1909, 1910, and 1912 to 1921, inclusive, for the North Platte substation are presented in Table 49. As only a few of the varieties were grown during the same years or over a long period, a varietal digest would mean little or nothing. Only one variety, Coast (C. I. No. 690), was grown for the entire period. The five others grown in 1909 were all dropped from the experiment by 1916. Two of these, Manchuria (C. I. No. 244) and Hanna (C. I. No. 24), are humid-area spring varieties and, as might be expected, produced very poor results. The other three, Black Hull-less (C. I. No. 596), Beardless (C. I. No. 639), and Nepal (C. I. No. 595), were inferior, as is usually the case wherever they are grown. Stavropol (C. I. No. 2103) was introduced in 1913 and was grown through 1921. During these nine years it produced nearly the same average yield as did Coast (C. I. No. 690). While somewhat different in appearance, these barleys belong to the same ecological group and are almost equally well suited to growing conditions here. Wisconsin Pedigree (C. I. No. 835), another Manchuria barley, was grown from 1914 to 1921, inclusive. It was surpassed by both Coast and Stavropol for the period. Horsford (C. I. No. 877) was grown for seven years, 1915 to 1921, inclusive, but was inferior to the three varieties first mentioned. White Smyrna (C. I. No. 658) produced the highest average yield of all the barleys grown for the six years, 1916 to 1921, inclusive. It will be remembered that in the western part of North Dakota and South Dakota the 2-rowed varieties White Smyrna and Hannchen are very productive. Hannchen, however, usually ripens a little later than White Smyrna and, although not tested at North Platte, probably would not be so successful. Gatami (C. I. No. 575) was the poorest sort in both 1919 and 1920 and was dropped from the experiment. Two varieties, Trebi (C. I. No. 936) and McClymont (C. I. No. 2126), were grown in 1920 and 1921. Trebi produced the highest average of all varieties for these two years and McClymont, a local barley, was second. Manchuria (C. I. No. 2330), grown in 1921, was superior only to Horsford and White Smyrna. Although it exceeded White Smyrna in this one year, it is apparent that when grown for several years the barleys of the Manchuria group can not compete with such varieties as Coast, Stavropol, or White Smyrna which are adapted to more arid regions.

There is no doubt as to the types of barley best suited to this section. White Smyrna is a high-yielding variety, but both Coast and Stavropol yield almost equally well and are preferable for general cultivation. They are the common barleys grown here.

MITCHELL, NEBR.

The records of yields of varieties of barley grown at the Scottsbluff Experiment Farm, Mitchell, Nebr., during the years 1914 to 1919, inclusive, were received through the courtesy of the Office of Western Irrigation Agriculture and are reported in Table 50. In 1914 12 varieties were tested, all of which were continued through 1916 with the exception of White Smyrna (C. I. No. 195). In 1915 this variety produced a relatively poor yield, 53.2 bushels, when all the other varieties yielded from 77.6 to 103.1 bushels. Of the 11 varieties grown during the years 1914 to 1916, inclusive, White Moravian (C. I. No. 977) ranks first. This is a 2-rowed barley of the Hanna group. Barbary (C. I. No. 695), a Coast barley, ranks next. It was continued through 1919, with an average yield of 68.1 bushels for the six years of the experiment. Barbary was the only variety grown for this entire period. Han River (C. I. No. 206) was third in rank for the three years 1914, 1915, and 1916. Svanhals (C. I. No. 187) was also a high-yielding sort for these years, but was exceeded in 1917 and 1918 by both Barbary and Trebi. The latter was introduced in 1917 and was continued through 1919. It produced the highest yield of any variety grown in the comparable years. Trebi, both in these and other tests at Scottsbluff, was so evidently a superior sort that it was distributed to farmers. On the farms it has given even better relative yields, and according to James A. Holden, superintendent of the Scottsbluff farm, 85 per cent of the acreage in that vicinity is of Trebi. Yields of 75 to 80 bushels to the acre are not uncommon.

Both the Coast and 2-rowed types have yielded well here, but the 6-rowed barleys are the ones usually grown.

TABLE 50.—*Annual acre yields of varieties of barley grown at the Scottsbluff Experiment Farm, Mitchell, Nebr., in part or all of the six years from 1914 to 1919, inclusive*

[Data furnished through the courtesy of the Office of Western Irrigation Agriculture]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915	1916	1917	1918	1919			
Hannchen	531	51.8	103.1	40.5	--------	--------	--------	3	65.1	98.8
White Moravian	977	91.6	102.2	37.0	--------	--------	--------	3	76.9	116.7
Franconian	680	61.0	90.1	47.1	56.2	--------	--------	4	63.6	97.4
Svanhals	187	64.0	77.6	67.8	60.4	56.9	--------	5	65.3	99.5
White Smyrna	195	65.1	53.2	--------	--------	--------	--------	2	59.1	78.0
Han River	206	72.9	102.0	47.4	--------	--------	--------	3	74.1	112.4
Barbary	695	72.2	101.0	49.3	63.2	71.2	51.7	6	68.1	104.8
Caucasian	90	29.1	100.5	57.4	--------	--------	--------	3	62.3	94.5
Scotch	848	62.8	99.8	36.8	--------	--------	--------	3	66.5	100.9
Coast	690	49.7	97.6	35.3	--------	--------	--------	3	60.9	92.4
Club Mariout	261	53.9	93.6	40.7	--------	--------	--------	3	62.7	95.1
Manchuria	244	37.0	88.5	47.9	--------	--------	--------	3	57.8	87.7
Thomas	2801	--------	--------	44.4	--------	--------	--------	1	44.4	96.5
Trebi	936	--------	--------	--------	79.4	79.5	53.2	3	70.7	114.4
Nepal	595	--------	--------	--------	46.5	--------	--------	1	46.5	76.1

MANHATTAN, KANS.

The barley yields at Manhattan, Kans., were obtained in cooperation with the Kansas Agricultural Experiment Station. Several varieties were grown in plat tests at this station in periods of varying length during the years 1903 to 1912, inclusive. The varieties were not sufficient in number and were not grown in plats for a period of sufficient length to be of value in this discussion. Tennessee Winter (C. I. No. 257) produced very high yields in 1904, 1905, and 1906, but it has never attained commercial importance in this section, because of the danger of winterkilling.

During the 10-year period from 1912 to 1921, inclusive, numerous varieties were grown in replicated nursery rows. Here, as at Cornell University Agricultural Experiment Station, it is thought that replicated row tests are adequate for the purposes of this discussion. From 1918 to 1921, inclusive, however, some of the varieties reported in Table 51 were replicated only three times or grown in only a single row. These yields are believed to be of sufficient importance to warrant including them, but the conclusions drawn from the varietal comparison may not be so accurate as in the case of some of the other stations.

The summarized digest of Table 51 shows a comparison of 10 representative varieties. Coast (C. I. No. 690) is the best of these, but as it was grown only three years its rank is not so definite as that of the others compared. O. A. C. 21 (C. I. No. 1470), a pedigreed Manchuria barley, was exceeded only by Coast. Third in point of yield is Odessa (C. I. No. 182), followed by Manchuria (C. I. No. 1472). Horsford (C. I. No. 1474), which is usually one of the lowest yielding sorts, is better than the remaining four in this group. White Smyrna (C. I. No. 195) is quite inferior at Manhattan.

TABLE 51.—*Annual acre yields of varieties of barley grown at the Kansas Agricultural Experiment Station (at Manhattan) in one or more of the 10 years from 1912 to 1921, inclusive*

[Data obtained in cooperation with the Kansas Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)									Years grown	Average yield (bus.)	Percentage of weighted mean
		1912	1914	1915	1916	1917	1918	1919	1920	1921			
Manchuria	1473	13.5	20.8	31.1	70.2	57.9	30.5	42.3	15.7	10.7	9	32.5	110.9
Black Hull-less	596	9.4	11.8	8.3	42.0	25.7	12.0	27.4	11.7	4.6	9	17.0	58.0
Black Smyrna	191	28.6	44.8	31.7	57.5	35.0	-----	-----	-----	-----	5	39.5	108.8
Horsford	1807	8.8	22.2	14.1	40.2	28.1	18.0	31.5	18.4	7.8	9	21.0	71.7
Do	1778	19.0	22.9	9.3	45.1	43.7	21.1	33.3	14.8	5.5	9	23.9	81.6
Wisconsin Winter	519	17.4	33.1	14.8	56.9	55.2	25.8	49.1	16.1	10.1	9	30.9	105.5
Bonanza	1800	9.7	22.8	19.2	53.8	42.7	21.0	47.3	14.1	6.4	9	26.3	89.8
Horsford	3171	6.7	19.5	10.1	-----	-----	-----	-----	-----	-----	3	12.1	55.8
Manchuria	3172	-----	20.0	20.7	62.0	48.2	-----	-----	-----	-----	4	37.7	98.9
Odessa	182	-----	31.3	42.7	57.5	65.3	23.3	38.9	15.4	8.7	8	35.4	118.0
Manchuria	1472	-----	31.3	26.3	60.0	48.2	28.5	37.9	16.1	13.2	8	32.7	109.0
Do	3173	-----	18.0	11.4	-----	-----	-----	-----	-----	-----	2	14.7	63.1
Do	2181	-----	29.9	28.1	59.0	-----	-----	-----	-----	-----	3	39.0	105.7
Do	3174	-----	24.2	18.4	-----	-----	-----	-----	-----	-----	2	21.3	91.4
Do	2182	-----	22.2	41.4	55.1	57.6	-----	-----	-----	-----	4	44.1	115.7
Do	3175	-----	27.3	17.7	-----	-----	-----	-----	-----	-----	2	22.5	96.6
Bonanza	3176	-----	25.0	13.9	-----	-----	-----	-----	-----	-----	2	19.5	83.7
Success	2183	-----	43.0	9.0	42.3	-----	-----	-----	-----	-----	3	31.4	85.1
Horsford	1474	-----	22.2	18.0	56.9	45.5	24.8	41.4	17.6	11.4	8	29.7	99.0
Bonanza	3177	-----	25.4	27.0	59.7	-----	-----	-----	-----	-----	3	37.4	101.4
Swedish Star	1701	-----	-----	-----	58.2	36.8	10.6	-----	-----	-----	3	35.2	83.0
Gold	1145	-----	-----	-----	54.8	40.6	20.9	31.3	9.8	-----	5	31.5	88.0
Oderbrucker	888	-----	-----	-----	78.4	-----	-----	-----	-----	-----	1	78.4	146.8
Manchuria	244	-----	-----	-----	61.1	-----	-----	45.9	17.9	14.2	4	34.8	109.4
Hannchen	531	-----	-----	-----	41.6	-----	-----	-----	-----	-----	1	41.6	77.9
Chevalier II	200	-----	-----	-----	55.2	-----	-----	-----	-----	-----	1	55.2	103.4
White Smyrna	658	-----	-----	-----	36.7	37.8	-----	-----	-----	-----	2	37.3	76.0
Gatami	575	-----	-----	-----	51.7	48.9	17.9	34.4	23.2	14.0	6	31.7	98.8
Nepal	595	-----	-----	-----	31.7	17.7	10.0	19 3	7.9	-----	5	17.3	48.3
Himalaya	620	-----	-----	-----	39.9	-----	-----	-----	-----	-----	1	39.9	74.7
Mensury	2657	-----	-----	-----	43.0	-----	-----	-----	-----	-----	1	43.0	80.5
White Smyrna	195	-----	-----	-----	70.0	28.1	23.8	32.3	10.0	8.7	6	28.8	89.7
Chevalier	2178	-----	-----	-----	51.3	-----	-----	-----	-----	-----	1	51.3	96.1
Silver King	890	-----	-----	-----	57.1	-----	-----	-----	-----	-----	1	57.1	106.9
Manchuria	1275	-----	-----	-----	62.1	50.7	19.1	38.2	15.7	10.4	6	32.7	101.9
Garton 68	2740	-----	-----	-----	62.9	18.4	-----	-----	-----	-----	2	40.7	82.9
O. A. C. 21	1470	-----	-----	-----	68.7	60.7	26.8	32.5	15.1	10.8	6	35.8	111.5
Svanhals	187	-----	-----	-----	18.7	-----	19.5	24.2	3.8	-----	4	16.5	48.1
Coast	690	-----	-----	-----	-----	-----	-----	45.9	14.6	12.5	3	24.3	119.1
Horsford	507	-----	-----	-----	-----	-----	-----	27.0	13.8	8.9	3	16.6	81.4
Himalaya	1585	-----	-----	-----	-----	-----	-----	40.0	8.6	5.6	3	18.1	88.7
Jet	1928	-----	-----	-----	-----	-----	-----	40.0	14.2	14.5	3	22.9	112.3
Club Mariout	261	-----	-----	-----	-----	-----	-----	-----	19.8	19.9	2	19.9	159.2
California Mariout	1455	-----	-----	-----	-----	-----	-----	-----	-----	14.7	1	14.7	138.7

TABLE 51.—*Annual acre yields of varieties of barley grown at the Kansas Agricultural Experiment Station (at Manhattan) in one or more of the 10 years from 1912 to 1921, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages									
			Gold	Manchuria	O. A. C. 21	Gatami	Odessa	Coast	White Smyrna	Nepal	Black Hull-less	Horsford
Gold	1145	Years comparable	------	5	5	5	5	2	5	5	5	5
		Percentage yield	------	82. 5	77. 2	89. 4	78. 5	67. 9	95. 9	181. 8	132. 5	84. 5
Manchuria	1472	Years comparable	5	------	6	6	8	3	6	5	8	8
		Percentage yield	121. 2	------	95. 0	107. 3	92. 4	92. 1	117. 9	220. 2	182. 2	110. 0
O. A. C. 21	1470	Years comparable	5	6	------	6	6	3	6	5	6	6
		Percentage yield	129. 5	105. 2	------	112. 9	102. 6	80. 0	124. 1	235. 3	173. 9	108. 6
Gatami	575	Years comparable	5	6	6	------	6	3	6	5	6	6
		Percentage yield	111. 9	93. 2	88. 6	------	90. 9	98. 1	109. 9	203. 3	154. 1	96. 2
Odessa	182	Years comparable	5	8	6	6	------	3	6	5	8	8
		Percentage yield	127. 3	108. 3	97. 4	110. 0	------	86. 3	120. 9	231. 4	197. 3	119. 0
Coast	690	Years comparable	2	3	3	3	3	------	3	2	3	3
		Percentage yield	147. 2	108. 6	125. 0	102. 0	115. 9	------	143. 1	222. 4	167. 0	103. 7
White Smyrna	195	Years comparable	5	6	6	6	6	3	------	5	6	6
		Percentage yield	104. 3	84. 8	80. 6	91. 0	82. 7	69. 9	------	189. 6	140. 1	87. 5
Nepal	595	Years comparable	5	5	5	5	5	2	5	------	5	5
		Percentage yield	55. 0	45. 4	42. 5	49. 2	42. 3	45. 0	52. 7	------	72. 9	46. 5
Black Hull-less	596	Years comparable	5	8	6	6	8	3	6	5	------	8
		Percentage yield	75. 5	54. 9	57. 5	64. 9	50. 7	59. 9	72. 4	137. 2	------	60. 3
Horsford	1474	Years comparable	5	8	6	6	8	3	6	5	8	------
		Percentage yield	118. 3	90. 9	92. 1	103. 9	84. 0	96. 4	114. 3	215. 0	165. 7	------

As shown in Table 51 four varieties were added in 1919. Coast was the best of these. Jet (C. I. No. 1928), a black hull-less sort, was second. Club Mariout (C. I. No. 261), grown in 1920 and 1921, produced the highest average yield of any barley grown in those years. Most of the varieties having an average yield of more than 100 per cent of the weighted mean, however, are of the Manchuria group. Although barley is not of commercial importance in this section of the State, probably Odessa and Manchuria are the types best adapted here.

McPHERSON, KANS.

Barley was grown at the McPherson Experiment Farm in cooperation with the Kansas Agricultural Experiment Station from 1906 to 1909, inclusive. The results are shown in Table 52. Of the varieties grown for the entire period Caucasian (C. I. No. 90) was the highest yielding sort. It is probably identical with Stavropol. Yenidje (C. I. No. 205), second in yield, is a barley which resembles the Coast type, although it originated in Asiatic Turkey. Odessa (C. I. No. 182), which also produced high yields at Manhattan, ranks third at this station. White Smyrna (C. I. No. 195) and Black Smyrna (C. I. No. 191) follow in the order named. Coast (C. I. No. 549) also yielded well. At Manhattan the barleys of the Manchuria and Odessa types produced the best yields of any tested over a period of years. At McPherson barleys from southern Russia, Asia Minor, and North Africa are the superior sorts, although several of the Manchuria barleys, such as Common (C. I. No. 184) and Baxter (C. I. No. 185), still do well.

TABLE 52.—*Annual acre yields of varieties of barley grown at the McPherson (Kans.) Experiment Farm in some or all of the four years from 1906 to 1909, inclusive*

[Data obtained in cooperation with the Kansas Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1906	1907	1908	1909			
Perm	20	30.2	4.0	25.1	20.9	4	20.1	102.0
Caucasian	90	51.5	10.4	33.9	22.5	4	29.6	150.3
Rennie Improved	181	28.7	3.5	23.9	23.1	4	19.8	100.5
Odessa	182	44.5	9.9	30.5	27.1	4	28.0	142.1
Nepean	183	37.8	4.0	26.2	----------	3	22.7	115.2
Common	184	36.2	5.8	28.2	21.7	4	23.0	116.8
Baxter	185	33.1	4.1	26.8	24.2	4	22.1	112.2
Beldi Dwarf	190	23.5	2.1	15.3	----------	3	13.6	69.0
Black Smyrna	191	48.9	10.5	17.1	19.4	4	24.0	121.8
White Smyrna	195	50.6	3.3	22.3	22.8	4	24.7	125.4
Albacete	199	45.4	9.1	16.8	16.4	4	21.9	111.2
Yenidje	205	51.8	4.8	32.5	25.3	4	28.6	145.2
Baku	210	28.2	.6	15.6	----------	3	14.8	75.1
Black Hull-less	596	30.4	2.1	15.7	11.9	4	15.0	76.1
Success	212	27.3	2.0	18.3	18.0	4	16.4	83.2
Hanna	203	40.7	.7	16.4	19.4	4	19.3	98.0
Manchuria	235	31.1	5.6	14.1	25.2	4	19.0	96.4
Do	237	35.2	4.7	15.3	23.6	4	19.7	100.0
Do	240	30.5	4.9	14.5	23.6	4	18.4	93.4
Club Mariout	261	28.3	3.4	25.4	7.9	4	16.3	82.7
Garton	263	32.2	2.5	4.9	----------	3	13.2	67.0
Do	264	29.7	.8	4.1	----------	3	11.5	58.4
Do	265	31.3	----------	----------	----------	1	31.3	87.4
Horsford	507	26.1	3.9	12.7	20.8	4	15.9	80.7
Coast	549	40.9	4.1	25.4	15.8	4	21.5	109.1
Gatami	575	----------	----------	12.8	23.1	2	17.9	94.7
Svanhals	187	----------	----------	8.1	17.3	2	12.7	67.2
Primus	532	----------	----------	2.2	4.4	2	3.3	17.5
Princess	529	----------	----------	13.5	13.7	2	13.6	72.0

HAYS, KANS.

In cooperation with the Kansas Agricultural Experiment Station, barley yields were obtained at the Fort Hays branch station in 12 of the 19 years from 1903 to 1921, inclusive. These are presented in Table 53, and a comparison of the yields of 10 representative varieties is also shown. The best of these was Ellis (C. I. No. 2107), a local barley. It is a mixture of several strains, with Coast types predominant. Club Mariout (C. I. No. 261), Stavropol (C. I. No. 2105), and Coast (C. I. No. 690), followed in the order named. Although Stavropol came from southern Russia, it is of the same general group as Coast and Club Mariout. The latter was very badly mixed at this station and its yields may mean little. Fifth in yield is Beldi Dwarf (C. I. No. 190), a North African barley. While White Smyrna (C. I. No. 195) ranks only sixth in this varietal comparison, it produced an average yield of 117 per cent of the weighted mean for the 11 years in which it was grown. The Manchuria barleys and Hannchen (C. I. No. 531) are not adapted to western Kansas, the climate there being too dry for the successful growing of spring barleys from humid climates.

Table 53 shows that several winter varieties were tested during the period from 1913 to 1916, inclusive. Tennessee Winter (C. I. No. 257) was the best of these. However, the winters here are usually too severe for the successful growing of these sorts. In 1920 five additional spring varieties were introduced. Two of these, Manchuria (C. I. Nos. 1275 and 1473), produced very poor yields and were not included in 1921. Meloy (C. I. No. 1176) averaged 27.5 bushels for the two years. This is a fairly good yield for a hooded barley, but Meloy has ranked relatively high at a number of the other stations. It is the only hooded spring barley that has proved at all successful in any of the experiments reported in the drier sections of the West. Odessa (C. I. No. 182) was not promising in 1920 and 1921, the two years in which it was grown. Of those tested, the Coast-Stavropol barleys are unmistakably the types best adapted to this region.

TABLE 53.—*Annual acre yields of varieties of barley grown at the Fort Hays (Kans.) branch station in one or more of the years from 1903 to 1921, inclusive*

[Data obtained in cooperation with the Kansas Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1903	1904	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Black Smyrna	191	19.3	2.7											2	11.0	85.9
White Smyrna	195	24.3	1.9	17.7	3.4		33.4	6.0	0	21.1	35.4	30.8	36.2	11	19.1	117.2
Hanna	203	20.1	1.7											2	10.9	85.2
Bavarian	159	27.3	1.2											2	14.3	111.7
Beldi Dwarf	190	20.6	5.6	22.7	7.8	14.0	23.0	8.5	0	23.8	41.3	26.3	33.8	12	18.9	116.7
Hankow	192	13.8	8.3											2	11.1	86.7
Telli	194	33.2	1.6											2	17.4	135.9
Tetcherit	196	20.5	2.4											2	11.5	89.8
Hankow	197	8.4	.6											2	4.5	35.2
Albacete	199	23.6	7.2											2	15.4	120.3
Kitzing	201	18.1	5.9											2	12.0	93.7
Black Arabian	202	31.7	3.0											2	17.3	135.2
Bavarian	248	26.7	3.6											2	15.1	118.0
Stavropol	2103			23.4	4.2	19.6	27.1	11.4	0	20.8	43.1	29.7	37.5	10	21.7	127.6
Gatami	575			20.2	6.3	14.0	22.2	12.0	0	20.2	35.2	12.0	32.0	10	17.4	102.4
Coast	690			24.2	4.6	20.0	26.5	8.5	0	16.6		26.1	46.8	9	19.3	120.6
Horsford	507			6.5	2.0	18.4						12.5		4	9.9	67.8
Manchuria	3182			5.4										1	5.4	34.4
Do	244			10.0	2.1	9.9						17.0	25.6	5	12.9	74.6
Svanhals	187			13.3	1.5	6.1								3	7.0	57.4
Oderbrucker	2184			7.3	2.7	9.6								3	6.5	53.3
Black Hull-less	596			10.9	2.5									2	6.7	65.0
Nepal	595			12.5	.2									2	6.3	61.2
Hannchen	531			13.9	2.9	7.1							32.4	4	14.1	88.1
White Smyrna	658			17.9	7.2	14.6								3	13.2	108.2
Club Mariout (badly mixed)	261			19.4	2.4	21.8	29.9	9.7	0	20.0	45.8	28.7	45.2	10	22.3	131.2
Ellis	2107			26.4	4.0	18.8	29.0	12.2	0	17.7		32.6		8	17.6	124.8
Austrian	2185				12.1	17.6	6.8	15.0						4	12.9	104.0
Tennessee Winter (fall sown)	257				21.4	22.9	7.5	14.7						4	16.6	133.9
Omar (fall sown)	898					18.7	10.8	12.9						3	14.1	91.0
Wisconsin Winter (fall sown)	519					26.7	7.4	13.7						3	15.9	102.6
Scottish Pearl (fall sown)	277					10.0	0							2	5.0	29.4
Meloy	1176											27.6	27.3	2	27.5	99.3
Himalaya	620											22.2	23.0	2	22.6	81.6
Manchuria	1275											17.0		1	17.0	73.6
Do	1473											20.1		1	20.1	87.0
Odessa	182											21.2	28.5	2	24.9	89.9

TABLE 53.—*Annual acre yields of varieties of barley grown at the Fort Hays (Kans.) branch station in one or more of the years from 1903 to 1921, inclusive*—Continued.

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

Variety	C. I. No.	Data shown	Varieties and percentages									
			Austrian	Hann-chen	Man-churia	Gatami	Coast	Stav-ropol	Beldi Dwarf	Club Mariout	White Smyrna	Ellis
Austrian	2185	Years comparable		2	2	4	4	4	4	4	3	4
		Percentage yield		297.0	247.5	94.5	86.4	82.7	96.6	80.7	79.2	80.5
Hannchen	531	Years comparable	2		4	4	4	4	4	4	3	3
		Percentage yield	33.7		118.3	77.7	58.9	66.5	71.9	63.4	85.9	48.6
Manchuria	244	Years comparable	2	4		5	5	5	5	5	4	4
		Percentage yield	40.4	84.5		76.4	53.1	56.5	61.8	55.0	62.1	47.7
Gatami	575	Years comparable	4	4	5		9	10	10	10	9	8
		Percentage yield	105.8	128.8	130.8		80.2	80.3	86.5	78.1	87.0	76.0
Coast	690	Years comparable	4	4	5	9		9	9	9	8	8
		Percentage yield	115.7	169.8	188.4	124.8		99.8	108.4	97.9	103.2	89.9
Stavropol	2105	Years comparable	4	4	5	10	9		10	10	9	8
		Percentage yield	121.0	150.4	177.1	124.5	100.2		107.8	97.3	107.2	96.8
Beldi Dwarf	190	Years comparable	4	4	5	10	9	10		10	11	8
		Percentage yield	103.5	139.1	161.9	115.6	92.3	92.8		90.3	101.5	89.6
Club Mariout	261	Years comparable	4	4	5	10	9	10	10		9	8
		Percentage yield	123.9	157.7	181.9	128.0	102.2	102.8	110.8		109.3	93.7
White Smyrna	195	Years comparable	3	3	4	9	8	9	11	9		7
		Percentage yield	126.3	116.5	161.1	114.9	96.9	93.3	98.5	91.5		92.2
Ellis	2107	Years comparable	4	3	4	8	8	8	8	8	7	
		Percentage yield	124.3	205.9	209.7	131.6	111.2	103.3	111.6	106.7	108.5	

COLBY, KANS.

Tests of barley varieties were carried on at the Colby substation during the four-year period from 1918 to 1921, inclusive. The data found in Table 54 were furnished through the courtesy of the Kansas Agricultural Experiment Station. Six varieties were grown for the entire period, of which Odessa (C. I. No. 182) was the best and Ellis (C. I. No. 2107) almost its equal. Coast (C. I. No. 690) and White Smyrna (C. I. No. 195) also produced good yields. It is evident from their yields that Manchuria (C. I. No. 244) and Gatami (C. I. No. 575) are not adapted to this section. Horsford (C. I. No. 507) was grown only in 1918 and 1919 and was then dropped, doubtless because it is a low-yielding sort. In 1921 seven other barleys were tested. Of these Meloy (C. I. No. 1176) was the best, being exceeded only by Odessa (C. I. No. 182). Stavropol (C. I. No. 2103) produced a yield slightly lower than Meloy, while Flynn (C. I. No. 1311) and Hannchen (C. I. No. 531) followed in the order named. Flynn is a smooth-awned hybrid and is one of the high-yielding smooth-awned barleys. Club Mariout (C. I. No. 261), Blackhull (C. I. No. 878), and California Mariout (C. I. No. 1455) were not outstanding in yield. It is again apparent that the barleys best adapted to this region are of the southern Russian, Asia Minor, and North African types.

TABLE 54.—*Annual acre yields of varieties of barley grown at the Colby (Kans.) substation in part or all of the four years from 1918 to 1921, inclusive*

[Data obtained through the courtesy of the Kansas Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1918	1919	1920	1921			
Ellis	2107	20.2	53.6	20.9	18.4	4	28.3	125.8
White Smyrna	195	12.7	42.6	24.9	17.7	4	24.5	108.9
Gatami	575	8.6	43.6	7.1	19.0	4	19.6	87.1
Odessa	182	9.6	53.9	19.7	30.3	4	28.4	126.2
Manchuria	244	1.5	49.2	9.7	19.6	4	20.0	88.9
Coast	690	7.1	47.1	26.1	19.6	4	25.0	111.1
Horsford	507	9.6	16.4	--------	--------	2	13.0	48.5
California Mariout	1455	--------	--------	--------	10.2	1	10.2	51.3
Meloy	1176	--------	--------	--------	23.4	1	23.4	117.6
Stavropol	2103	--------	--------	--------	23.3	1	23.3	117.1
Hannchen	531	--------	--------	--------	20.0	1	20.0	100.5
Flynn	1311	--------	--------	--------	22.0	1	22.0	110.6
Blackhull	878	--------	--------	--------	17.1	1	17.1	85.9
Club Mariout	261	--------	--------	--------	17.6	1	17.6	88.4

TABLE 55.—*Annual acre yields of varieties of barley grown at the Garden City (Kans.) substation in part or all of the three years 1919, 1920, and 1921*

[Data furnished through the courtesy of the Kansas Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)			Years grown	Average yield (bus.)	Percentage of weighted mean
		1919	1920	1921			
Coast	690	8.1	13.6	28.9	3	16.9	109.7
Odessa	182	7.5	22.6	20.6	3	16.9	109.7
Manchuria	244	6.3	24.6	8.3	3	13.1	85.1
Gatami	575	1.3	13.3	--------	2	7.3	57.0
White Smyrna	195	8.1	14.1	33.0	3	18.4	119.5
Club Mariout	261	--------	21.4	--------	1	21.4	116.9

GARDEN CITY, KANS.

The annual yields of barley varieties at the Garden City substation were furnished through the courtesy of the Kansas Agricultural Experiment Station. These are reported in Table 55 for the years 1919, 1920, and 1921. Only four varieties were tested in all three years. Of these White Smyrna (C. I. No. 195) produced the highest average yield. Coast (C. I. No. 690) and Odessa (C. I.

No. 182) follow, each having an average yield of 109.7 per cent of the weighted mean. While Manchuria (C. I. No. 244) was the best in 1920 it was very low in 1919 and 1921, making the average yield quite low as compared with the other three varieties. Gatami (C. I. No. 575) was grown in 1919 and 1920, but was inferior to all others in both years. Club Mariout (C. I. No. 261), with a yield of 21.4 bushels, ranked third of the six varieties tested in 1920, the only year it was grown. White Smyrna has yielded well at nearly all of the Kansas stations, but because of its very short straw it probably is not so good for commercial purposes as either Odessa or Coast.

TRIBUNE, KANS.

The annual yields of barley varieties grown at the Tribune (Kans.) substation were furnished through the courtesy of the Kansas Agricultural Experiment Station. Barley was grown here for only the four years, 1918 to 1921, inclusive (Table 56). In 1921 the crop was a complete failure. Coast (C. I. No. 690) was the best in the four-year period. Next in order was Ellis (C. I. No. 2107), a local barley of the Coast type, with Odessa (C. I. No. 182) third. White Smyrna (C. I. No. 195) was the highest yielding variety in 1920, but produced very low yields in the two previous years. Club Mariout (C. I. No. 261) was grown only in 1920, but ranked second among the varieties grown that year. At practically all the stations in western Kansas these five, together with Stavropol, have been the barleys outstanding in yield. At Tribune, as at the other stations in western Kansas, Manchuria (C. I. No. 244) and Gatami (C. I. No. 575) are in a region unsuited to their culture. While several barleys showed up well at these stations, only Coast and Stavropol are grown commercially.

TABLE 56.—*Annual acre yields of varieties of barley grown at the Tribune (Kans.) substation in one or more of the four years from 1918 to 1921, inclusive*

[Data furnished through the courtesy of the Kansas Agricultural Experiment Station]

Variety	C. I. No.	Acre yield (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1918	1919	1920	1921			
Odessa	182	14.1	21.0	38.8	....	3	24.6	102.1
Gatami	575	13.1	16.2	25.1	....	3	18.1	75.1
White Smyrna	195	2.4	17.7	49.4	0	4	17.4	87.0
Manchuria	244	2.3	20.2	18.8	0	4	10.3	51.5
Coast	690	23.6	25.3	47.6	0	4	24.1	120.5
Ellis	2107	27.1	14.9	43.6	0	4	21.4	107.0
Horsford	507	11.9	....	....	....	1	11.9	88.1
Club Mariout	261	....	....	47.9	....	1	47.9	123.8

HAVRE, MONT.

Barley varieties have been tested at the northern Montana substation at Havre during the 6-year period from 1916 to 1921, inclusive. The yields, presented in Table 57, were obtained in cooperation with the Montana Agricultural Experiment Station. Four varieties were first grown in 1916, two of which, White Smyrna (C. I. No. 195) and Hannchen (C. I. No. 531), were continued through the six years of the experiment. White Smyrna produced the higher average yield. Coast (C. I. No. 690) was grown from 1916 to 1920, inclusive, but also was surpassed by White Smyrna. Nepal (C. I. No. 595) was inferior to the other three varieties during the five years from 1916 to 1919, inclusive, and in 1921.

In 1917 eight varieties were introduced, all of which were continued in the experiment through 1921. Horn (C. I. No. 926), a 2-rowed variety of the Chevalier type, was superior to all the other sorts. Following Horn are three other lax 2-rowed barleys, Bohemian (C. I. No. 27), Goldfoil (C. I. No. 928), and Holland (C. I. No. 952). These four in this period excelled both White Smyrna and Hannchen as well as all of the 6-rowed sorts. Han River (C. I. No. 206), which was the best of the 6-rowed barleys, surpassed the North African varieties, Beldi Giant (C. I. No. 2777) and Sandrel (C. I. No. 937), by only a small margin. Trebi (C. I. No. 936) was not at all suited to the conditions which prevailed during the years it was grown.

Without doubt, this is a district favorable to the cultivation of 2-rowed barleys. The Chevalier and Hanna varieties, which seem to be superior types here, differ somewhat from Hannchen and White Smyrna in that they require a somewhat longer but cooler growing season. At Lethbridge, Alberta, Canada, the second highest yielding variety grown for a period of years also was a barley of the Chevalier group, namely, Chevalier II (C. I. No. 200).

Table 57.—*Annual acre yields of varieties of barley grown at the northern Montana substation (at Havre) in part or all of the six years from 1916 to 1921, inclusive*

[Data obtained in cooperation with the Montana Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1916	1917	1918	1919	1920	1921			
White Smyrna	195	61. 7	16. 7	12. 0	1. 5	8. 3	12. 7	6	18. 8	142. 4
Coast	690	63. 8	8. 6	9. 6	3. 4	10. 7	--------	5	19. 2	140. 1
Hannchen	531	55. 4	13. 0	15. 4	3. 5	6. 9	9. 7	6	17. 3	131. 1
Nepal	595	43. 7	9. 0	11. 9	3. 5	--------	8. 5	5	15. 3	115. 0
Trebi	936	--------	8. 3	14. 2	1. 7	8. 6	9. 4	5	8. 4	81. 6
Han River	206	--------	12. 0	12. 7	3. 0	12. 8	6. 6	5	9. 4	91. 3
Horn	926	--------	13. 0	17. 7	3. 0	22. 9	15. 3	5	14. 4	139. 8
Goldfoil	928	--------	11. 0	15. 4	3. 6	13. 1	15. 4	5	11. 7	113. 6
Beldi Giant	2777	--------	12. 5	12. 7	2. 8	10. 4	7. 1	5	9. 1	88. 3
Bohemian	27	--------	13. 0	14. 8	3. 5	15. 9	12. 1	5	11. 9	115. 5
Sandrel	937	--------	11. 0	10. 2	2. 6	12. 5	10. 4	5	9. 3	90. 3
Holland	952	--------	11. 0	15. 9	3. 3	14. 6	13. 3	5	11. 6	112. 6
Flynn	1311	--------	--------	--------	--------	--------	11. 5	1	11. 5	104. 5

MOCCASIN, MONT.

The barley yields at the Judith Basin (Moccasin, Mont.) substation were obtained in cooperation with the Montana Agricultural Experiment Station. Barley was harvested in 13 of the years from 1908 to 1921, inclusive. The crop of 1912 was destroyed by hail. Annual and average yields for the entire period are shown in Table 58.

Table 58.—*Annual acre yields of varieties of barley grown at the Judith Basin substation (Moccasin, Mont.) in one or more of the 14 years from 1908 to 1921, inclusive*

[Data obtained in cooperation with the Montana Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)													Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Mansury	617	20. 0	45. 7	13. 0	38. 3	48. 7	38. 0	70. 8	40. 0	11. 2	45. 0	3. 5	----	----	11	34. 0	104. 0
Thorpe	921	10. 0	53. 3	11. 1	28. 3	52. 6	39. 2	66. 7	36. 0	9. 0	----	----	----	----	9	34. 0	97. 7
Evans	892	5. 5	32. 6	10. 3	19. 3	----	----	----	----	----	----	----	----	----	4	16. 9	65. 3
Black Hull-less	596	10. 0	43. 8	13. 6	25. 3	----	----	----	----	----	----	----	----	----	4	23. 2	89. 6
Himalaya	620	5. 5	33. 2	12. 3	25. 0	44. 3	30. 3	48. 8	18. 7	10. 3	35. 9	4. 8	29. 6	43. 4	13	26. 3	79. 0
Nepal	595	20. 0	42. 4	16. 4	30. 0	37. 0	25. 7	41. 8	22. 1	8. 1	30. 0	2. 3	21. 9	39. 6	13	25. 9	77. 8
Bohemian	27	----	48. 5	11. 2	----	----	----	----	----	----	----	----	----	----	2	29. 9	127. 2
Manchuria	244	----	45. 2	9. 8	40. 8	39. 2	36. 0	52. 2	33. 5	9. 6	43. 3	2. 5	15. 6	39. 6	12	30. 6	89. 7
Hannchen	531	----	----	14. 4	45. 8	54. 3	46. 0	78. 8	46. 0	13. 3	53. 3	5. 2	29. 2	52. 4	11	39. 9	118. 7
White Smyrna	195	----	----	12. 3	52. 0	65. 7	50. 0	80. 3	46. 0	16. 0	42. 8	5. 0	29. 2	39. 2	11	39. 9	118. 7
Beldi Giant	2777	----	----	8. 0	43. 7	53. 7	42. 2	73. 6	27. 9	13. 1	42. 3	6. 5	----	----	9	34. 6	104. 5
Coast	690	----	----	15. 0	43. 7	55. 0	43. 1	83. 1	32. 0	14. 6	39. 0	8. 3	27. 5	44. 5	11	36. 9	109. 8
Gatami	575	----	----	8. 2	34. 4	----	----	----	----	----	----	----	----	----	2	21. 3	89. 1
Club Mariout	261	----	----	16. 2	47. 0	47. 9	51. 3	72. 0	32. 8	15. 2	35. 1	6. 9	24. 4	45. 8	11	35. 9	106. 8
Canadian Thorpe	740	----	----	----	----	50. 0	36. 0	65. 1	----	----	----	----	----	----	3	50. 4	98. 1
Svanhals	187	----	----	----	----	48. 9	43. 5	68. 1	39. 6	11. 9	47. 3	3. 1	29. 2	50. 2	9	38. 0	106. 4
Clyde	909	----	----	----	----	37. 5	22. 0	----	----	----	----	----	----	----	2	29. 7	69. 4
Franconian	680	----	----	----	----	----	31. 2	80. 0	40. 0	11. 9	50. 0	4. 4	27. 3	48. 5	8	36. 7	107. 3
Heil Hanna 2	678	----	----	----	----	----	29. 5	78. 2	37. 5	9. 8	----	----	----	----	4	38. 7	102. 4
White Smyrna	910	----	----	----	----	----	----	----	33. 7	20. 2	46. 1	6. 9	27. 5	48. 7	6	30. 5	110. 9
Meloy	1176	----	----	----	----	----	----	----	33. 7	15. 8	44. 8	5. 0	34. 0	44. 8	6	29. 7	108. 0
July	1563	----	----	----	----	----	----	----	----	----	----	----	----	30. 2	1	30. 2	67. 9
Horn	926	----	----	----	----	----	----	----	----	----	----	----	----	52. 1	1	52. 1	117. 1

TABLE 58.—*Annual acre yields of varieties of barley grown at the Judith Basin substation (Moccasin, Mont.) in one or more of the 14 years from 1908 to 1921, inclusive*—Continued.

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

Variety	C.I. No.	Data shown	Varieties and percentages									
			Mansury	Svanhals	Franconian	Hannchen	Manchuria	Coast	Club Mariout	White Smyrna	Meloy	Nepal
Mansury	617	Years comparable	------	7	6	9	10	9	9	4	4	11
		Percentage yield	------	98.0	95.9	86.4	113.5	92.4	95.1	93.3	100.4	135.7
Svanhals	187	Years comparable	7	------	8	9	9	9	9	6	6	9
		Percentage yield	102.0	------	99.9	90.3	125.9	98.5	103.1	99.0	101.8	149.6
Franconian	680	Years comparable	6	8	------	8	8	8	8	6	6	8
		Percentage yield	104.3	100.1	------	90.5	126.3	100.4	103.5	99.5	102.2	153.2
Hannchen	531	Years comparable	9	9	8	------	11	11	11	6	6	11
		Percentage yield	115.8	110.7	110.5	------	136.2	108.1	111.2	108.9	112.0	159.6
Manchuria	244	Years comparable	10	9	8	11	------	11	11	6	6	12
		Percentage yield	88.1	79.4	79.2	73.4	------	79.4	81.6	78.7	80.9	115.8
Coast	690	Years comparable	9	9	8	11	11	------	11	6	6	11
		Percentage yield	108.2	101.6	99 6	92.5	126.0	------	102.8	90.6	93.1	147.6
Club Mariout	261	Years comparable	9	9	8	11	11	11	------	6	6	11
		Percentage yield	105.2	97.0	96.7	89.9	122.5	97.2	------	87.5	89.9	143.5
White Smyrna	910	Years comparable	4	6	6	6	6	6	6	------	6	6
		Percentage yield	107.2	101.0	100.5	91.8	127.1	110.4	114.3	------	102.8	147.7
Meloy	1176	Years comparable	4	6	6	6	6	6	6	6	------	6
		Percentage yield	99.6	98.2	98.7	89.3	123.6	107.4	111.2	97.3	------	143.6
Nepal	595	Years comparable	11	9	8	11	12	11	11	6	6	------
		Percentage yield	73.7	66.9	65.3	62.7	86.4	67.7	69.7	67.7	69.6	------

Ten well-known varieties representative of the different types and groups were chosen for the purposes of the varietal comparison. The highest yields were obtained from Hannchen (C. I. No. 531) and White Smyrna (C. I. No. 910), while Franconian (C. I. No. 680), another 2-rowed barley representative of the Hanna group, ranked third. Coast (C. I. No. 690) and Svanhals (C. I. No. 187) are of almost equal importance. While Meloy (C. I. No. 1176) does not show up well in this comparison, it produced an average yield of 108 per cent of the weighted mean for the six years in which it was grown. The results from this hooded variety have been quite encouraging at a number of the stations in this same general region. Manchuria (C. I. No. 244) exceeded only Nepal (C. I. No. 595), the poorest of the varieties compared. Both of the North African barleys, Coast (C. I. No. 690) and Club Mariout (C. I. No. 261), yielded well during the 11 years they were grown but were inferior to the 2-rowed varieties, Hannchen and White Smyrna.

In 1921 varieties named July (C. I. No. 1563) and Horn (C. I. No. 926) were introduced. July, a 6-rowed sort, produced the lowest yield, but Horn, a Chevalier barley, was exceeded only by Hannchen in that one year. At Havre, Mont., the Chevalier and Hanna barleys were superior to Hannchen and White Smyrna for the years in which they were comparable.

It is evident, however, that to the south of Havre Hannchen and White Smyrna are the most widely adapted 2-rowed varieties. This is due in part to the fact that they mature somewhat earlier than the barleys of the Chevalier and Hanna types.

HUNTLEY, MONT.

The barley data from Huntley, Mont., as presented in Table 59, were obtained through the courtesy of the Office of Western Irrigation Agriculture. Only one variety, Trebi (C. I. No. 936), was grown for the five years from 1917 to 1921, inclusive. The other varieties tested were grown only in 1918. Trebi, with a yield of 70.5 bushels, ranked highest of the five tested that year. The other varieties were all 2-rowed sorts. White Smyrna (C. I. No. 195) was the best of these, with Chevalier II (C. I. No. 200) almost its equal. Hannchen (C. I. No. 531) and Svanhals (C. I. No. 187) were fourth and fifth, respectively, but were quite low in yield as compared with Trebi. Although Huntley is in a district favorable to the production of 2-rowed barleys, Trebi seems to be a superior sort there under irrigation, and in drier, hotter years it would doubtless yield much more than the 2-rowed varieties.

TABLE 59.—*Annual acre yields of varieties of barley grown at the Huntley (Mont.) Experiment Farm in part or all of the five years from 1917 to 1921, inclusive*

[Data obtained through the courtesy of the Office of Western Irrigation Agriculture]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1917	1918	1919	1920	1921			
Trebi	936	49.7	70.5	70.7	56.5	47.0	5	58.9	101.4
White Smyrna	195	--------	62.0	--------	--------	--------	1	62.0	103.7
Chevalier II	200	--------	61.5	--------	--------	--------	1	61.5	102.8
Hannchen	531	--------	53.9	--------	--------	--------	1	53.9	90.1
Svanhals	187	--------	50.9	--------	--------	--------	1	50.9	85.1

BOZEMAN, MONT.

The data on yields of barley varieties grown at Bozeman, Mont., were received through the courtesy of the Montana Agricultural Experiment Station. From 1905 to 1912, inclusive, barley was grown in fortieth-acre plats. From 1913 to 1921, inclusive, it was grown only in replicated rows. It is thought that the yields for the period 1905 to 1912, inclusive, are best suited for the purposes of this bulletin. These yields are shown in Table 60.

TABLE 60.—*Annual acre yields of varieties of barley grown at the Montana Agricultural Experiment Station (at Bozeman) in some or all of the eight years from 1905 to 1912, inclusive*

[Data obtained through the courtesy of the Montana Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1905	1906	1907	1908	1909	1910	1911	1912			
New Zealand	2656	90.8	86.7	64.2	75.0	78.3	39.4	85.2	64.2	8	73.0	117.9
Kitzing	189	101.7	76.7	58.3	57.5	74.2	47.9	88.3	76.7	8	72.7	117.4
Scotch Chevalier	2767	82.9	70.8	69.6	66.7	82.5	47.5	92.5	68.3	8	72.6	117.3
Chevalier	2768	64.2	48.3	72.9	54.2	80.0	50.0	100.0	79.2	8	68.6	110.8
Princess	529	60.0	60.0	72.2	48.1	60.0	34.8	93.3	71.3	8	62.5	101.0
Hannchen	531	45.8	68.3	50.6	53.4	76.3	56.6	83.7	86.4	8	65.1	105.2
Beldi Dwarf	190	81.0	58.3	58.8	56.7	72.5	35.4	93.3	67.5	8	65.4	105.7
California Prolific	2649	91.8	66.7	49.6	60.8	85.0	31.7	75.8	56.7	8	64.8	104.7
Himalaya	620	86.7	62.5	62.5	50.0	48.7	42.7	83.3	70.7	8	63.4	102.4
Manchuria	244	43.9	56.3	56.1	62.5	68.7	34.8	77.9	81.3	8	60.2	97.3
Frankish	207	62.5	62.5	66.7	63.7	64.2	31.6	81.7	50.8	8	60.5	97.7
Odessa	182	66.3	60.8	50.4	51.7	58.3	34.2	69.2	85.0	8	59.5	96.1
Berkley	2769	55.8	58.3	60.0	38.7	67.5	47.5	86.7	56.7	8	58.9	95.2
Nepal	630	70.4	46.7	50.0	52.1	77.1	37.3	68.7	62.0	8	58.0	93.7
Nepbant	2770	73.3	54.2	54.6	45.0	45.0	39.3	64.7	47.3	8	52.9	85.5
Evans	892	45.0	46.7	59.1	58.3	------	35.3	67.3	62.0	7	53.4	87.1
Nepal	595	58.3	55.8	57.9	28.8	56.7	33.1	67.6	55.7	8	51.7	83.5
Black Hull-less	596	39.6	38.3	58.8	62.1	------	38.7	64.7	61.3	7	51.9	84.7
Bavarian	208	63.3	57.5	60.0	63.7	------	------	------	------	4	61.1	105.9
Canadian Thorpe	740	59.2	37.5	------	------	------	------	------	------	2	48.3	80.0
Kulu	2694	54.2	47.5	------	------	------	------	------	------	2	50.9	84.3
Manchuria	2774	43.3	34.2	49.6	45.9	------	------	------	------	4	43.3	75.0
O. A. C. 21	1470	41.7	44.2	54.6	50.0	------	------	------	------	4	47.6	82.5
Chevalier II	200	------	------	62.1	70.8	89.2	58.3	84.2	77.5	6	73.7	118.3
Svanhals	187	------	------	47.9	67.5	76.2	69.6	78.3	77.5	6	69.5	111.6
Gutekorn	606	------	------	44.6	55.8	65.8	49.2	80.8	76.7	6	62.1	99.7
Sexradigt	607	------	------	45.0	55.0	58.3	50.8	80.8	85.0	6	62.5	100.3
Primus	532	------	------	40.0	48.5	71.4	67.3	86.6	75.8	6	64.9	104.2
Spear	2776	------	------	59.6	55.0	84.2	64.2	103.7	91.7	6	76.4	122.6
Hanna	2773	------	------	------	35.4	55.0	62.5	86.7	67.5	5	61.4	97.3
Manhattan Malting	157	------	------	------	51.1	51.7	64.2	67.5	69.2	5	60.7	96.2
Garton 986	645	------	------	------	46.7	76.7	47.5	95.0	71.7	5	67.5	107.0
White Smyrna	658	------	------	------	------	35.0	104.2	85.0	------	3	74.7	118.8
Shansi	2775	------	------	------	------	58.3	40.0	58.3	62.0	4	54.7	84.3
Chevalier	2771	------	------	------	------	------	19.2	95.4	69.2	3	61.3	95.2
Chile Chevalier	659	------	------	------	------	------	18.8	82.5	60.8	3	54.0	83.9
Chile Common	663	------	------	------	------	------	27.1	99.2	83.3	3	69.9	108.5
Chile Brewing	2772	------	------	------	------	------	20.4	95.8	76.7	3	64.3	99.8
Tatien	665	------	------	------	------	------	19.7	62.0	54.0	3	45.2	70.2
Wyoming Hull-less	629	------	------	------	------	------	27.7	67.3	58.7	3	51.2	79.5
Kashgar Hull-less	528	------	------	------	------	------	35.0	56.7	56.7	3	49.5	76.9
Poda	652	------	------	------	------	------	2.7	96.7	89.8	3	63.1	98.0
Peru	653	------	------	------	------	------	18.3	95.8	98.3	3	70.8	109.9
Silver King	1276	------	------	------	------	------	26.3	77.5	75.0	3	59.6	92.5

TABLE 60.—*Annual acre yields of varieties of barley grown at the Montana Agricultural Experiment Station (at Bozeman) in some or all of the eight years from 1905 to 1912, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 12 REPRESENTATIVE VARIETIES

[Under "Data shown" P=Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown	Varieties and percentages											
			New Zealand	California Prolific	Svanhals	Kitzing	Hannchen	Manchuria	Odessa	Peru	White Smyrna	Beldi Dwarf	Nepal	Himalaya
New Zealand	2656	Y	------	8	6	8	8	8	8	3	3	8	8	8
		P	------	112. 7	97. 4	100. 4	112. 0	121. 2	122. 7	88. 9	90. 5	111. 5	125. 7	115. 1
California Prolific	2649	Y	8	------	6	8	8	8	8	3	3	8	8	8
		P	88. 7	------	86. 2	89. 1	99. 4	107. 6	108. 9	77. 3	85. 9	99. 0	111. 6	102. 2
Svanhals	187	Y	6	6	------	6	6	6	6	3	3	6	6	6
		P	102. 6	116. 0	------	103. 5	102. 5	109. 4	119. 6	106. 1	100. 0	108. 5	120. 1	116. 5
Kitzing	189	Y	8	8	6	------	8	8	8	3	3	8	8	8
		P	99. 6	112. 2	96. 6	------	111. 6	120. 7	122. 1	100. 2	93. 8	111. 0	125. 2	114. 6
Hannchen	531	Y	8	8	6	8	------	8	8	3	3	8	8	8
		P	89. 3	100. 6	97. 6	89. 6	------	108. 2	109. 5	106. 7	96. 6	99. 5	112. 2	102. 8
Manchuria	244	Y	8	8	6	8	8	------	8	3	3	8	8	8
		P	82. 5	92. 9	91. 4	82. 8	92. 4	------	101. 2	91. 3	80. 9	92. 0	103. 7	95. 0
Odessa	182	Y	8	8	6	8	8	8	------	3	3	8	8	8
		P	81. 5	91. 9	83. 6	81. 9	91. 3	98. 8	------	88. 7	72. 1	90. 9	102. 5	93. 8
Peru	653	Y	3	3	3	3	3	3	3	------	2	3	3	3
		P	112. 5	129. 4	94. 2	99. 8	93. 7	109. 5	112. 7	------	60. 3	108. 3	126. 4	108. 0
White Smyrna	658	Y	3	3	3	3	3	3	3	2	------	3	3	3
		P	110. 5	116. 5	100. 0	106. 0	103. 5	123. 6	138. 7	165. 8	------	111. 4	122. 4	128. 3
Beldi Dwarf	190	Y	8	8	6	8	8	8	8	3	3	------	8	8
		P	89. 7	101. 0	92. 1	90. 1	100. 5	108. 7	110. 0	92. 4	89. 7	------	112. 8	103. 2
Nepal	630	Y	8	8	6	8	8	8	8	3	3	8	------	8
		P	79. 5	89. 6	83. 3	79. 9	89. 1	96. 4	97. 6	79. 1	81. 7	88. 7	------	91. 6
Himalaya	620	Y	8	8	6	8	8	8	8	3	3	8	8	------
		P	86. 9	97. 9	85. 8	87. 2	97. 3	105. 3	106. 6	92. 6	77. 9	96. 9	109. 2	------

A comparison of six varietal groups was made, of which Coast was probably the best. As only three varieties were included and as this group is comparable with other groups for only three years, its relative position is not positive. The Chevalier group is second, with Hanna and Thorpe following, successively. These three consist only of 2-rowed sorts. The Manchuria barleys are entirely out of their ecological district here. The hull-less group was the poorest, as is the case at most stations.

In the summarized digest of Table 60, 12 important and representative varieties are compared. White Smyrna (C. I. No. 658) ranked first. It is to be regretted that it can be compared with the other varieties for only three years, as it produced an exceptionally high yield in 1910 but relatively low yields in 1909 and 1911. Svanhals (C. I. No. 187) exceeded all the others compared in this table except White Smyrna and was its equal in the three years it was grown. New Zealand (C. I. No. 2656), a representative of the Chevalier group, was third in point of yield, with Kitzing (C. I. No. 189), of the Hanna group, following. These barleys are also 2-rowed sorts.

Peru (C. I. No. 653), a variety of the Coast group, is fifth. Beldi Dwarf (C. I. No. 190), a 6-rowed North African barley, gave an average yield of 106 per cent of the weighted mean for the eight years in which it was tested, but it was exceeded by Peru and four 2-rowed varieties. As demonstrated at the other stations in Montana this section is undoubtedly in the region where the 2-rowed barleys are well adapted. At the present time a number of varieties are being tested which seem quite promising. Among these are the 6-rowed varieties Trebi (C. I. No. 936), Flynn (C. I. No. 1311), and Meloy (C. I. No. 1176).

SHERIDAN, WYO.

The barley yields at the Sheridan Experiment Farm were obtained in cooperation with the Office of Dry-Land Agriculture Investigations. Table 61 shows the yields for the varieties grown from 1917 to 1921, inclusive. Of these, White Smyrna (C. I. No. 195) was the best, Trebi (C. I. No. 936) second, and Svanhals (C. I. No. 187) third. Coast (C. I. No. 690) was almost the equal of Svanhals, with Hannchen (C. I. No. 531) following. Club Mariout (C. I. No. 261) and Manchuria (C. I. No. 244) produced only fair yields. In 1921 Flynn (C. I. No. 1311) and Horn (C. I. No. 926) were introduced into the experiment. As all the yields for this year were very low, owing to scant rainfall, a fair comparison can not be made. It is interesting to note that Trebi, a 6-rowed barley that has given high yields under irrigation, is second here to White Smyrna, a 2-rowed sort, which is one of the best varieties for dry-land conditions. As far as tested, it appears that, in general, the 2-rowed barleys are the most successful types in northern Wyoming.

TABLE 61.—*Annual acre yields of varieties of barley grown at the Sheridan (Wyo.) Experiment Farm in part or all of the five years from 1917 to 1921, inclusive*

[Data obtained in cooperation with the Office of Dry-Land Agriculture Investigations]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1917	1918	1919	1920	1921			
Svanhals	187	11.7	35.1	0	21.3	4.6	5	14.5	109.8
White Smyrna	195	24.6	26.5	.8	29.4	3.9	5	17.0	128.8
Hannchen	531	13.3	30.9	.1	21.1	2.7	5	13.6	103.0
Club Mariout	261	20.8	17.9	.4	19.2	2.5	5	12.2	92.4
Manchuria	244	12.1	28.5	.3	22.9	1.6	5	13.1	99.2
Coast	690	18.3	26.7	.5	24.0	2.1	5	14.3	108.3
Trebi	936	18.3	33.1	.3	23.9	2.5	5	15.6	118.2
Nepal	595	10.3	13.0	0	10.4		4	8.4	52.2
Flynn	1311					3.6	1	3.6	120.0
Horn	926					3.3	1	3.3	110.0

ARCHER, WYO.

Varietal tests of barley have been conducted at the Cheyenne Experiment Farm, Archer, Wyo., since 1913. The data presented in Table 62 were obtained in cooperation with the Wyoming State Board of Farm Commissioners.

TABLE 62.—*Annual acre yields of varieties of barley grown at the Cheyenne (Archer, Wyo.) Experiment Farm in part or all of the nine years from 1913 to 1921, inclusive*

[Data obtained in cooperation with the Wyoming State Board of Farm Commissioners]

Variety	C. I. No.	Acre yields (bushels)									Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1917	1918	1919	1920	1921			
Hannchen	531	9.6	16.0	34.1	7.9	28.9	56.3	3.9	23.3	24.6	9	22.7	111.8
Primus	532	8.9	8.3	33.9	4.3	22.9					5	15.7	98.1
Hanna	24	8.8	10.8	32.0							3	17.2	102.4
Manchuria	241	6.6	11.8	33.5	5.6	25.9	47.1	2.7	10.0	16.7	9	17.8	87.7
Nepal	595	6.4	10.0	29.7	2.4	16.3					5	13.0	81.3
Manchuria	244	7.2	9.6	30.2							3	15.7	93.5
Baku	709	6.5	10.4	29.1							3	15.3	91.1
Blackhull	878	3.5	14.8	22.7	7.8	12.9	41.4	1.7	12.4	20.4	9	15.3	75.4
Horsford	877	6.3	14.5	26.6	6.2	19.7	41.7	1.9	11.5		8	16.1	80.1
Hanna	203	7.5									1	7.5	102.7
Gatami	575	4.4	15.5	23.7	7.0	21.6					5	14.4	90.0
Coast	690	6.6	14.4	41.2	8.0	28.4	59.4	3.8	24.3	21.8	9	23.1	113.8
White Smyrna	658	10.0	16.3	38.3	8.3	27.2	64.3	3.8	20.6	24.4	9	23.7	116.7
Black Hull-less	1106	12.3	9.4	34.7	2.4	23.0	55.9	6.0	17.1	18.4	9	19.8	97.5
Yerli	660	5.7	9.6	30.6	4.4						4	12.6	87.5
Svanhals	187	5.9	11.9	31.6	7.1	27.2	62.4	2.8	18.4	20.2	9	20.8	102.5
Himalaya	620				7.3	19.5	62.3	3.4	16.7	22.3	6	21.9	98.2
Horn	926					30.2	68.1	3.6	25.0	23.7	5	30.1	119.4
Italian	914						66.6	2.9	22.1	21.4	4	28.3	110.5
Sandrel	937						73.1	4.2	23.3	23.4	4	31.0	121.1
Odessa	927						52.4	4.8	21.5	26.6	4	26.3	102.7
Trebi	936						57.3	5.0	26.9	24.3	4	28.4	110.9
Meloy	1176								23.2	22.0	2	22.6	108.1
Flynn	1311									22.0	1	22.0	99.5

TABLE 62.—*Annual acre yields of varieties of barley grown at the Cheyenne (Archer, Wyo.) Experiment Farm in part or all of the nine years from 1913 to 1921, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 12 REPRESENTATIVE VARIETIES

[Under "Data shown" P=Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown.	Varieties and percentages											
			Horn	Svanhals	Italian	Hannchen	Manchuria	Odessa	Coast	Sandrel	Trebi	White Smyrna	Black Hull-less	Horsford
Horn	926	Y	------	5	4	5	5	4	5	4	4	5	5	4
		P	------	115.0	106.5	109.9	147.1	114.3	109.4	97.1	106.1	107.3	125.1	169.7
Svanhals	187	Y	5	------	4	9	9	4	9	4	4	9	9	8
		P	87.0	------	91.9	91.6	117.3	98.6	90.2	83.7	91.5	87.9	104.6	130.3
Italian	914	Y	4	4	------	4	4	4	4	4	4	4	4	3
		P	93.9	108.9	------	104.5	147.7	107.3	103.4	91.1	99.6	99.9	116.0	166.2
Hannchen	531	Y	5	9	4	------	9	4	9	4	4	9	9	8
		P	91.0	109.1	95.7	------	128.0	102.7	98.4	87.2	95.2	96.0	114.2	140.2
Manchuria	241	Y	5	9	4	9	------	4	9	4	4	9	9	8
		P	68.0	85.3	67.7	78.2	------	72.6	76.9	61.7	67.4	75.0	89.2	111.5
Odessa	927	Y	4	4	4	4	4	------	4	4	4	4	4	3
		P	87.5	101.4	93.2	97.4	137.6	------	96.3	84.9	92.8	93.1	108.1	142.8
Coast	690	Y	5	9	4	9	9	4	------	4	4	9	9	8
		P	91.4	110.9	96.7	101.6	130.0	103.8	------	88.1	96.3	97.5	116.0	144.9
Sandrel	937	Y	4	4	4	4	4	4	4	------	4	4	4	3
		P	103.0	119.5	109.7	114.7	162.1	117.8	113.4	------	109.3	109.6	127.3	182.6
Trebi	936	Y	4	4	4	4	4	4	4	4	------	4	4	3
		P	94.3	109.3	100.4	105.0	148.4	107.8	103.8	91.5	------	100.4	116.5	161.9
White Smyrna	658	Y	5	9	4	9	9	4	9	4	4	------	9	8
		P	93.2	113.7	100.1	104.2	133.3	107.4	102.5	91.2	99.6	------	119.0	147.0
Black Hull-less	1106	Y	5	9	4	9	9	4	9	4	4	9	------	8
		P	79.9	95.6	86.2	87.6	112.1	92.5	86.2	78.5	85.8	84.1	------	125.2
Horsford	877	Y	4	8	3	8	8	3	8	3	3	8	8	------
		P	58.9	76.7	60.2	71.3	89.7	70.0	69.0	54.8	61.8	68.0	79.9	------

Among the varieties compared in Table 62 there are four, Sandrel (C. I. No. 937), Trebi (C. I. No. 936), Italian (C. I. No. 914), and Odessa (C. I. No. 927), which were grown for only four years. Although Sandrel is the highest yielding variety for these years, its rank, as well as that of the other three grown for this period, is not so definite as it would be if the results for a greater number of years had been included. Following Sandrel is Horn (C. I. No. 926), a 2-rowed sort which is promising at several of the Montana stations. Trebi (C. I. No. 936) ranks third. White Smyrna (C. I. No. 658), which is next in order, was grown for the entire period of nine years, its average yield being 116.7 per cent of the weighted mean. Another high-yielding variety was Italian (C. I. No. 914), a barley of the Hanna type. Although Coast (C. I. No. 690) and Hannchen (C. I. No. 531) do not make so good a showing in this table, they produced relatively good yields during the nine years of the experiment. As usual, Horsford (C. I. No. 877) and Black Hull-less (C. I. No. 1106) were poor-yielding sorts. Manchuria (C. I. No. 241) and Odessa (C. I. No. 927) are evidently unsuited to growing conditions here. The table of yields shows that Meloy (C. I. No. 1176) gave fair returns for two years, 1920 and 1921. Flynn (C. I. No. 1311), which was grown in 1921, was the equal of Meloy.

White Smyrna in general should give better results than other 2-rowed sorts of the Coast types. Because of its short straw, however, it is probably not so desirable for field culture as some of the other varieties tested. It seems quite evident that Archer is near the line where the Coast is equal to the 2-rowed varieties in yield.

FORT COLLINS, COLO.

The yields of barley varieties at the Colorado Agricultural Experiment Station, Fort Collins, for the period from 1918 to 1921, inclusive, are shown in Table 63. Records of these yields were obtained through the courtesy of the Colorado station. Twenty-two varieties were grown for the entire four years. Of these Coast (C. I. No. 2785) produced the highest average yield, 76.9 bushels. Two 2-rowed barleys belonging to the Hanna group, Hanna (C. I. No. 2784) and Gold

(C. I. No. 1145), were second and third. Following Gold are Coast (C. I. No. 2790) and Colsess (C. I. No. 2792), the latter a hybrid variety which was produced at this station. Coast (C. I. No. 2789) is almost the equal of Colsess. As shown in Table 63 the varieties grown during the entire four years which had an average of more than 100 per cent of the weighted mean were either Coast or Hanna types with the exception of Colsess and Charlottetown 80 (C. I. No. 2732). Coast (C. I. No. 2791) was introduced in 1919, but was found inferior to several of the other pedigreed Hanna and Coast barleys. Golden Drop (C. I. No. 2135), a variety of the Chevalier group, was grown in 1920 and 1921, but was not a superior sort in either of those years.

Twelve varieties were introduced in 1921. With the exception of Bark (C. I. No. 2793) all of these produced relatively high yields. Manchuria (C. I. No. 2783) and O. A. C. 21 (C. I. No. 1470), both pedigreed strains of Manchuria barley, were the highest yielders that year. This is rather surprising, as the Manchuria types would appear to be entirely out of their ecological region in Colorado.

Considering the whole period of the experiment, however, there is no doubt that the barleys of the Coast and Hanna types were the highest yielding sorts. Fort Collins, like Archer, Wyo., is apparently near the line separating the district where the 2-rowed varieties grow best from that in which Coast is a superior type. In the 2-rowed district east and north of Fort Collins, Hannchen and White Smyrna were usually the best of the 2-rowed barleys. At this station Hannchen yielded well in 1921, the only year it was grown, but White Smyrna was not tested.

TABLE 63.—*Annual acre yields of varieties of barley grown at the Colorado Agricultural Experiment Station (Fort Collins) in part or all of the four years from 1918 to 1921, inclusive*

[Data obtained through the courtesy of the Colorado Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1918	1919	1920	1921			
Hanna	2784	73.1	59.0	76.5	83.1	4	72.9	115.3
Coast	2785	78.8	67.5	81.8	79.7	4	76.9	121.7
Gold	1145	65.8	59.6	81.8	76.9	4	71.0	112.3
Hanna	2786	61.6	58.3	82.0	76.0	4	69.5	110.0
Do	2787	68.7	50.5	74.6	75.6	4	67.3	106.5
Coast	2789	70.0	58.0	78.9	73.6	4	70.1	110.9
Colsess	2792	70.4	53.1	84.8	73.1	4	70.3	111.2
Hanna	2788	66.0	53.8	75.2	72.4	4	66.9	105.9
Coast	2790	69.8	62.9	78.0	72.4	4	70.8	112.0
Charlottetown 80	2732	67.8	50.0	69.6	70.8	4	64.5	102.1
Black Hull-less	596	33.0	49.7	62.7	65.9	4	52.8	83.5
Silver King	890	53.7	33.7	60.0	64.5	4	53.0	83.9
Coast	690	69.2	64.2	77.9	63.8	4	68.8	108.9
Telli	194	53.1	49.5	71.3	63.6	4	59.4	94.0
Garton 986	645	59.2	51.5	73.9	60.5	4	61.3	97.0
Chevalier II	200	59.7	55.9	76.2	59.2	4	62.7	99.2
Horsford	507	32.2	28.2	50.5	56.3	4	41.8	66.1
Wing Pedigree	1177	34.8	27.3	57.5	55.6	4	43.8	69.3
Horsford	1271	35.9	33.7	55.2	50.3	4	43.8	69.3
Princess	529	61.7	45.7	66.2	54.9	4	57.1	90.3
Nepal	595	32.0	44.7	63.3	47.7	4	46.9	74.2
Blackhull	878	53.2	46.9	51.3	49.0	4	50.1	79.3
Coast	2791	--------	60.0	78.1	65.5	3	67.9	105.1
Golden Drop	2135	--------	--------	73.3	68.5	2	70.9	101.3
O. A. C. 21	1470	--------	--------	--------	88.6	1	88.6	127.5
Manchuria	2783	--------	--------	--------	88.4	1	88.4	127.2
Moister	2799	--------	--------	--------	83.8	1	83.8	120.6
Elfry	2800	--------	--------	--------	81.3	1	81.3	117.0
Canadian Thorpe	740	--------	--------	--------	80.1	1	80.1	115.3
Samofa	1211	--------	--------	--------	80.1	1	80.1	115.3
Manchuria	2330	--------	--------	--------	77.3	1	77.3	111.2
Minsturdi	1556	--------	--------	--------	76.9	1	76.9	110.6
Svansota	1907	--------	--------	--------	73.0	1	73.0	105.0
Lion	923	--------	--------	--------	69.8	1	69.8	100.4
Bark	2793	--------	--------	--------	47.0	1	47.0	67.6
Hannchen	531	--------	--------	--------	76.2	1	76.2	109.6

TABLE 64.—*Annual acre yields of varieties of barley grown at the United States Dry-Land Field Station, Akron, Colo., in part or all of the 14 years from 1908 to 1921, inclusive*

[Data obtained in cooperation with the Office of Dry-Land Agriculture Investigations]

Variety	C. I. No.	Acre yields (bushels)														Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Blackhull	878	25.4	20.1	23.8	5.8	26.6	25.4	42.9	77.1	19.7	19.9	11.0	12.9	14.5	16.2	14	24.4	92.4
Hanna	203	34.2	22.2	27.9	14.3	39.7	28.1	42.5	70.5	20.9	10.4	4.2	7.4			12	26.8	98.2
Hannchen	531	47.8	20.7	28.2	10.4	52.0	22.3	52.7								7	33.4	116.8
Mansury	617	33.2	12.1													2	22.7	82.2
Coast	690	38.6	32.8	25.5	16.7	38.5	22.5	59.3	79.1	20.8	17.8	8.1	10.2	28.0	20.8	14	29.9	113.3
Horsford	877	31.9	22.3	21.2	7.9	30.0	16.5	24.0		8.8	11.1	5.2	6.6	17.0	16.8	13	16.9	73.8
Nepal	595	25.1	25.8	19.4	.6	18.8	6.8	41.6	56.0	7.0	7.2	3.0	7.2	18.7	13.3	14	17.9	67.8
Manchuria	244		21.5	18.4	15.2	34.6	25.4	40.0								6	25.9	92.2
Hanna	24			23.5	12.9	43.1	18.3	40.7	72.2							6	35.1	101.7
Primus	532			32.3	2.3	17.9	6.6	42.1								5	20.2	70.1
Tennessee Winter	257			5.8	9.4	15.4	19.1									4	12.4	52.3
White Smyrna	658				27.5	35.8	20.4	70.4	80.9	19.7						6	42.5	125.7
Orel	2190					57.3	32.0	42.5	73.3							4	51.3	126.4
Baku	709					27.7	6.8				11.7	5.8	8.5	18.9	15.1	7	13.5	67.8
Chile Common	2186					57.3	30.8									2	44.1	158.6
Odessa	2187					35.1										1	35.1	95.4
White Smyrna	2080					65.1	21.1	73.3	75.7							4	58.8	144.8
Yenidje	2189					30.4										1	30.4	82.6
Arlington Awnless	702						22.9	41.6								2	32.3	100.0
Gatami	575						25.4	65.0								2	45.2	139.9
Composite	1147						21.6	44.5	66.0	14.8						4	36.7	98.1
Svanhals	187						4.6									1	4.6	23.2
Smyrna	2642								86.0	23.9	17.1	13.7	10.3	28.5	18.2	7	28.2	119.5
Oderbrucker	2191								55.5	6.7						2	31.1	68.4
White Smyrna	195									20.3	19.6	12.2	11.0	26.1	17.7	6	17.8	125.4
Orel	351										14.9	7.5	9.7	37.5	14.9	5	16.9	122.5
Nakano Wase	754											5.5	4.4			2	4.9	59.8
Blackhull	2087														15.2	1	15.2	93.3
Himalaya	620														15.3	1	15.3	93.9

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 10 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			Primus	Hanna	Hannchen	Manchuria	Coast	Smyrna	Baku	Blackhull	Orel	Horsford
Primus	532	Years comparable	----	5	5	5	5	(*)	2	5	3	5
		Percentage yield	----	66.4	61.1	75.7	62.3	----	71.0	81.3	50.5	101.6
Hanna	203	Years comparable	5	----	7	6	12	5	5	12	4	11
		Percentage yield	150.7	----	89.2	112.6	87.1	75.1	148.4	103.8	88.2	135.7
Hannchen	531	Years comparable	5	7	----	6	7	(*)	2	7	3	7
		Percentage yield	163.6	112.1	----	120.1	100.1	----	215.4	137.7	96.4	152.2
Manchuria	244	Years comparable	5	6	6	----	6	(*)	2	6	3	6
		Percentage yield	132.0	88.8	83.3	----	79.4	----	173.9	107.3	75.9	127.2
Coast	690	Years comparable	5	12	7	6	----	7	7	14	4	13
		Percentage yield	160.6	114.8	99.9	125.9	----	93.5	154.4	122.7	97.2	154.9
Smyrna	2642	Years comparable	(*)	5	(*)	(*)	7	----	5	7	1	6
		Percentage yield	----	133.2	----	----	107.0	----	146.3	115.4	117.3	170.5
Baku	709	Years comparable	2	5	2	2	7	5	----	7	2	7
		Percentage yield	140.8	67.4	46.4	57.5	64.8	68.3	----	74.7	38.6	91.6
Blackhull	878	Years comparable	5	12	7	6	14	7	7	----	4	13
		Percentage yield	123.0	96.4	72.6	93.2	81.5	86.6	133.9	----	83.9	120.5
Orel	2190	Years comparable	3	4	3	3	4	1	2	4	----	3
		Percentage yield	197.9	113.4	103.8	131.8	102.9	85.2	258.8	119.2	----	187.0
Horsford	877	Years comparable	5	11	7	6	13	6	7	13	3	----
		Percentage yield	98.4	73.7	65.7	78.6	64.6	58.6	109.2	83.0	53.5	----

AKRON, COLO.

The barley yields at the Akron field station (Table 64) were obtained in cooperation with the Office of Dry-Land Agriculture Investigations. Ten important varieties are compared in the summarized digest of the table. Smyrna (C. I. No. 2642) is the best of the varieties included in the comparison. It was not grown in the same years as Hannchen (C. I. No. 531), Primus (C. I. No. 532), or Manchuria (C. I. No. 244), so that a comparison with these varieties can not be made. Following Smyrna is Hannchen (C. I. No. 531). In 1915 this variety became confused with another. As a consequence, no comparison can be made after 1914. Orel (C. I. No. 2190) is third in point of yield. This strain is thought to be identical with Orel (C. I. No. 351), which was grown from 1917 to 1921, inclusive. However, Orel (C. I. No. 351) was surpassed by Coast (C. I. No. 690) as well as by the two Smyrna varieties in this later period. Orel is usually grown as a winter barley, and it is of interest that it is a high-yielding sort when sown in the spring at Akron. Coast (C. I. No. 690) was almost the equal of both Hannchen and Orel. For the 14 years of the experiment Coast produced an average yield of 113 per cent of the weighted mean. Hanna (C. I. No. 203) and Manchuria (C. I. No. 244) follow in the order named. Blackhull (C. I. No. 878) was superior to Primus (C. I. No. 532), Baku (C. I. No. 709), and Horsford (C. I. No. 877). (See Pl. III, fig. 2, A and B.) Grown for the full period of the experiment, 1908 to 1921, inclusive, its average yield was 92 per cent of the weighted mean. Blackhull has yielded better at Akron than at most of the other stations, and those who have been in charge of the testing think that the uniformity of its yields and other excellent qualities make it a desirable variety. As can be seen in Table 64, the winter barleys, Tennessee Winter (C. I. No. 257), Arlington Awnless (C. I. No. 702), and Nakano Wase (C. I. No. 754), which were grown during different periods, were not high-yielding sorts as compared with the spring varieties.

While the 2-rowed barleys are undoubtedly the highest yielding sorts at Akron, it is evident that Coast is also well adapted to this district. It appears that Akron, Archer, and Fort Collins are all near the border line between the 2-rowed and Coast districts. Where the yield is equal, farmers usually prefer 6-rowed varieties, as the straw of the 2-rowed ones is often weak and in White Smyrna is very short.

SANDPOINT, IDAHO

The yields of barley varieties at the Sandpoint substation for the years 1920 and 1921 were obtained through the courtesy of the Idaho Agricultural Experiment Station. These yields are found in Table 65. As the crop of 1921 was almost a failure, the yields for this year are of little value in determining the relative importance of the varieties grown. Han River (C. I. No. 206) produced the highest average yield for the two years of the experiment, while White Smyrna (C. I. No. 910) ranked second. Baker (C. I. No. 975), Trebi (C. I. No. 936), and Peruvian (C. I. No. 935) follow in the order named. Winter Club (C. I. No. 488) was grown only in 1921, but was exceeded by both White Smyrna and Peruvian.

TABLE 65.—*Annual acre yields of varieties of barley grown at the Sandpoint (Idaho) substation in 1920 and 1921*

[Data obtained through the courtesy of the Idaho Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)		Years grown	Average yield (bus.)	Percentage of weighted mean
		1920	1921			
Han River	206	24.5	3.2	2	13.9	149.4
Trebi	936	14.5	2.3	2	8.4	90.3
White Smyrna	910	17.2	4.0	2	10.6	114.0
Peruvian	935	9.1	3.7	2	6.4	68.8
Baker	975	17.2	3.0	2	10.1	108.6
Winter Club	488	----------	3.2	1	3.2	100.0

MOSCOW, IDAHO

Table 66 shows the yields of varieties of barley grown from 1910 to 1921, inclusive, at Moscow, Idaho. Records of these yields were obtained through the courtesy of the Idaho Agricultural Experiment Station. The high yield of the winter varieties shown here is most striking. Moscow is situated in the Palouse district, which lies just to the west of the western Rocky Mountain Ranges. It has a mild winter climate, and in the better part of the Palouse district there is an average annual rainfall of 20 to 25 inches, with an average of only a few inches in the months of April to July, inclusive. The soil, which is unusually fertile, is a wind-formed deposit. These conditions are favorable to the growth of winter barleys, and it is likely that only the time needed for wheat seeding prevents their extensive culture.

Of the spring-sown varieties introduced into the experiment before 1919 only Winter Club (C. I. No. 488) was grown through 1921, the others being dropped in 1920. Of these varieties White Smyrna (C. I. No. 195) was perhaps the best. However, a selection of this variety (C. I. No. 910) which was grown in 1920 and 1921 did not prove to be as high yielding as the others grown in those two years. Winter Club (C. I. No. 488), when spring sown, was second, and Hannchen (C. I. No. 531) was third in point of yield. Following Hannchen are Chile Common (C. I. No. 663) and California Centgener (C. I. No. 3147), both North African barleys of the Coast group. Svanhals (C. I. No. 187) also gave a fair average yield, but was surpassed by the varieties mentioned above in the years for which it was comparable. Of the five spring barleys grown only in 1920 and 1921 Peruvian (C. I. No. 935) was the best. This is also of North African origin and belongs to the Coast group. Trebi (C. I. No. 936) and Baker (C. I. No. 975) were second and third in rank, respectively. Han River (C. I. No. 206) was better than either Winter Club or White Smyrna in the two years.

TABLE 66.—*Annual acre yields of varieties of barley grown at the Idaho Agricultural Experiment Station (at Moscow) in one or more of the 12 years from 1910 to 1921, inclusive*

[Data obtained through the courtesy of the Idaho Agricultural Experiment Station]

Variety	C.I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
White Smyrna	195	38.0	47.9	82.0	48.5	52.5	84.0	70.3	32.8	14.5	44.3	----	----	10	51.5	126.5
Nepal	595	33.8	27.5	37.6	----	----	----	33.3	14.8	6.3	22.4	----	----	7	25.1	65.7
Hannchen	531	43.3	34.6	53.3	60.2	42.7	----	76.4	22.5	12.0	37.1	----	----	9	42.5	107.9
Winter Club	488	----	----	97.3	60.2	60.0	48.5	54.8	31.8	20.5	37.6	77.6	54.2	10	54.3	115.8
Oderbrucker	3146	----	----	----	13.2	48.1	49.7	56.2	51.2	14.8	37.1	----	----	7	38.6	97.5
Svanhals	187	----	----	----	38.1	58.7	65.1	69.4	17.8	7.9	39.8	----	----	7	42.4	107.1
White Moravian	1877	----	----	----	33.3	51.4	29.8	51.1	22.2	7.0	39.7	----	----	7	33.5	84.6
California Centgener	3147	----	----	----	----	----	70.3	59.8	22.4	20.0	33.2	----	----	5	41.1	107.0
Beldi Dwarf	190	----	----	----	----	----	43.1	70.1	23.9	4.7	42.7	----	----	5	36.9	96.1
Arlington Awnless	702	----	----	----	----	----	9.9	26.6	22.2	6.0	35.5	----	----	5	20.0	52.1
Chile Common	663	----	----	----	----	----	71.7	57.1	29.0	21.6	35.9	----	----	5	43.1	112.2
Wing Beardless	2147	----	----	----	----	----	----	27.1	13.6	5.5	21.7	----	----	4	17.0	46.7
Abed	1389	----	----	----	----	----	----	52.9	21.5	11.6	40.9	----	----	4	31.7	87.1
Beardless	3145	----	----	----	----	----	----	60.8	40.7	9.7	39.3	----	----	4	37.6	103.3
White Smyrna	910	----	----	----	----	----	----	----	----	----	----	76.9	47.2	2	62.1	84.4
Han River	206	----	----	----	----	----	----	----	----	----	----	77.5	56.5	2	67.0	91.0
Trebi	936	----	----	----	----	----	----	----	----	----	----	89.6	62.7	2	76.1	103.4
Peruvian	935	----	----	----	----	----	----	----	----	----	----	87.1	72.9	2	80.0	108.7
Baker	975	----	----	----	----	----	----	----	----	----	----	87.1	62.5	2	74.8	101.6
Winter barley:																
Winter Club	488	----	----	----	----	----	----	----	----	41.0	102.9	83.7	81.2	4	77.2	161.8
Wisconsin Winter	519	----	----	----	----	----	----	----	----	40.5	101.3	74.3	77.3	4	73.3	153.7
Tennessee Winter	257	----	----	----	----	----	----	----	----	26.7	87.9	60.8	75.0	4	62.6	131.2
Michigan Winter	2036	----	----	----	----	----	----	----	----	37.9	88.6	72.9	95.8	4	73.8	154.7

The winter barleys mentioned were first seeded in the fall of 1917, being harvested in the summers of 1918 to 1921, inclusive. Winter Club (C. I. No. 488) produced the highest average yield, 77.2 bushels, in these years. This variety is a superior one here when either spring or fall sown. Michigan Winter (C. I. No. 2036) and Wisconsin Winter (C. I. No. 519) follow in the order named. Tennessee Winter (C. I. No. 257) was the lowest in rank of the winter sorts. Except in 1920 all of the winter barleys were superior to the spring varieties.

It is evident that the climatic conditions here are such that several distinct types of barley may be successfully grown. Of the spring varieties both the 2-rowed sorts and the barleys of the Coast group are outstanding in yield. Trebi and Baker, representative of still another group, also seem promising. There is no doubt, however, that the winter barleys are superior in yield so far as they have been tested at Moscow. Even in field culture, despite occasional winter-killing, which might be expected, the winter barleys may be more profitable than the spring varieties.

ABERDEEN, IDAHO

Irrigated land.—The Aberdeen substation is most advantageously situated for testing barleys under irrigation, particularly those of the types adapted to arid and semiarid conditions. It is located in the Snake River basin of southern Idaho at an altitude of 4,400 feet. The growing season is short, and the river makes available a water supply for irrigation purposes. Extensive nursery and plat tests of barley varieties have been made at the Aberdeen substation in recent years. Most of the varieties tested seem to produce maximum yields here.

TABLE 67.—*Annual acre yields of varieties of barley grown on irrigated land at the Aberdeen (Idaho) substation in part or all of the nine years from 1913 to 1921, inclusive*

[Data obtained in cooperation with the Idaho Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)									Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1917	1918	1919	1920	1921			
Silver King	905	26. 0	-----	-----	-----	-----	-----	-----	-----	-----	1	26. 0	46. 2
Svanhals	187	60. 8	58. 2	70. 5	-----	-----	-----	-----	-----	-----	3	63. 2	95. 6
Hanna	906	54. 1	59. 5	65. 0	-----	-----	-----	-----	-----	-----	3	59. 5	90. 0
Manchuria	244	43. 3	63. 0	73. 9	-----	-----	-----	-----	-----	-----	3	60. 1	90. 9
Club Mariout	261	63. 8	39. 0	-----	-----	-----	-----	-----	-----	-----	2	51. 4	83. 2
Princess	529	46. 6	-----	-----	-----	-----	-----	-----	-----	-----	1	46. 6	82. 8
Hannchen	531	61. 6	73. 3	80. 6	89. 5	84. 1	68. 7	20. 8	55. 4	86. 2	9	68. 9	102. 7
White Smyrna	195	69. 5	-----	-----	-----	-----	-----	-----	-----	-----	1	69. 5	123. 4
Han River	206	78. 3	68. 7	81. 7	67. 4	92. 9	57. 0	28. 0	55. 7	97. 9	9	69. 7	103. 9
Woodrow	986	71. 5	-----	-----	-----	-----	-----	-----	-----	-----	1	71. 5	127. 0
White Moravian	977	64. 1	57. 8	72. 8	85. 8	-----	-----	-----	-----	-----	4	70. 1	103. 9
Composite	1147	56. 8	47. 0	89. 6	-----	-----	-----	-----	-----	-----	3	64. 5	97. 6
Wisconsin Winter	519	63. 3	77. 9	78. 4	-----	-----	-----	-----	-----	-----	3	73. 2	110. 7
Coast	690	51. 6	67. 6	53. 7	-----	-----	-----	-----	-----	-----	3	57. 6	87. 1
Gatami	575	49. 5	-----	-----	-----	-----	-----	-----	-----	-----	1	49. 5	87. 9
Beldi Giant	2777	56. 0	88. 2	80. 6	62. 4	96. 6	70. 7	30. 5	69. 9	96. 0	9	72. 3	107. 7
Coast	2235	65. 0	67. 6	-----	-----	-----	-----	-----	-----	-----	2	66. 3	107. 3
Chevalier	278	50. 4	-----	-----	-----	-----	-----	-----	-----	-----	1	50. 4	89. 5
Union	2198	49. 0	-----	-----	-----	-----	-----	-----	-----	-----	1	49. 0	87. 0
Do	2199	48. 0	-----	-----	-----	-----	-----	-----	-----	-----	1	48. 0	85. 3
Nepal	230	40. 3	-----	-----	-----	-----	-----	-----	-----	-----	1	40. 3	71. 6
Bavarian	160	70. 0	59. 5	-----	-----	-----	-----	-----	-----	-----	2	64. 7	104. 7
Odessa	927	-----	81. 3	79. 5	66. 6	-----	-----	-----	-----	-----	3	75. 8	106. 5
White Smyrna	910	-----	70. 4	63. 8	90. 4	87. 5	53. 7	29. 3	53. 7	93. 7	8	67. 8	98. 0
Chevalier II	200	-----	58. 6	71. 6	-----	-----	-----	-----	-----	-----	2	65. 1	92. 7
Club Mariout	932	-----	59. 7	-----	-----	-----	-----	-----	-----	-----	1	59. 7	90. 7
Trebi	936	-----	85. 9	84. 0	69. 6	105. 0	92. 8	25. 3	78. 7	96. 7	8	79. 7	115. 2
Servian	915	-----	76. 7	81. 7	66. 2	-----	-----	-----	-----	-----	3	74. 9	105. 3
Eagle	913	-----	68. 7	76. 1	54. 1	-----	-----	-----	-----	-----	3	66. 3	93. 2
Sandrel	937	-----	84. 7	80. 5	67. 4	98. 7	64. 9	29. 9	72. 5	86. 0	8	73. 1	105. 6
Peruvian	935	-----	74. 4	84. 0	74. 9	87. 9	54. 5	30. 4	67. 5	94. 2	8	71. 0	102. 6
Featherston	911	-----	69. 8	-----	-----	-----	-----	-----	-----	-----	1	69. 8	106. 1
Luth	908	-----	66. 4	73. 9	-----	-----	-----	-----	-----	-----	2	70. 1	99. 9
Manchuria	1275	-----	34. 9	-----	-----	-----	-----	-----	-----	-----	1	34. 9	53. 0
Steigum	907	-----	43. 3	-----	-----	-----	-----	-----	-----	-----	1	43. 3	65. 8
Goldfoil	928	-----	67. 6	71. 7	83. 4	-----	-----	-----	-----	-----	3	74. 2	104. 4
Horn	926	-----	67. 0	78. 4	83. 3	80. 0	-----	-----	-----	-----	4	77. 2	105. 2
Australian White	925	-----	66. 4	70. 5	-----	-----	-----	-----	-----	-----	2	68. 5	97. 7
Italian	914	-----	71. 0	81. 7	88. 4	75. 4	-----	-----	-----	-----	4	79. 1	107. 8
Baker	975	-----	-----	-----	-----	-----	43. 3	30. 1	63. 7	85. 2	4	55. 6	91. 9
Rasput	996	-----	-----	-----	-----	-----	34. 9	-----	-----	-----	1	34. 9	60. 8
Petro	994	-----	-----	-----	-----	-----	33. 3	-----	-----	-----	1	33. 3	58. 0
Algerian	1179	-----	-----	-----	-----	-----	-----	-----	57. 5	70. 8	2	64. 1	83. 6

TABLE 67.—*Annual acre yields of varieties of barley grown on irrigated land at the Aberdeen (Idaho) substation in part or all of the nine years from 1913 to 1921, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 12 REPRESENTATIVE VARIETIES

[Under "Data shown" P=Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown	Varieties and percentages											
			Horn	Svanhals	Italian	Hannchen	Manchuria	Odessa	Sandrel	Beldi Giant	White Smyrna	Trebi	Han River	Wisconsin Winter
Horn	926	Y	------	2	4	4	2	3	4	4	4	4	4	2
		P	------	113.0	97.5	94.3	106.2	100.6	93.2	94.2	98.9	89.6	99.4	93.0
Svanhals	187	Y	2	------	2	3	3	2	2	3	2	2	3	3
		P	88.5	------	84.3	87.9	105.2	80.0	77.9	84.3	95.9	75.8	82.9	86.3
Italian	914	Y	4	2	------	4	2	3	4	4	4	4	4	2
		P	102.5	118.6	------	96.6	111.5	106.0	95.5	96.6	101.4	91.9	101.9	97.7
Hannchen	531	Y	4	3	4	------	3	3	8	9	8	8	9	3
		P	106.1	113.7	103.5	------	119.6	107.0	95.6	95.3	103.0	87.6	98.8	98.1
Manchuria	244	Y	2	3	2	3	------	2	2	3	2	2	3	3
		P	94.2	95.1	89.7	83.6	------	85.1	82.9	80.2	102.0	80.6	78.8	82.1
Odessa	927	Y	3	2	3	3	2	------	3	3	3	3	3	2
		P	99.4	124.9	94.3	93.4	117.5	------	97.8	98.4	101.2	94.9	104.4	102.9
Sandrel	937	Y	4	2	4	8	2	3	------	8	8	8	8	2
		P	107.3	128.4	104.7	104.7	120.7	102.3	------	98.3	107.8	91.6	16.4	105.7
Beldi Giant	2777	Y	4	3	4	9	3	3	8	------	8	8	9	3
		P	106.2	118.6	103.6	105.0	124.8	101.7	101.8	------	109.7	93.2	103.7	102.4
White Smyrna	910	Y	4	2	4	8	2	3	8	8	------	8	8	2
		P	101.1	104.3	98.6	97.1	98.0	98.8	92.8	91.2	------	85.0	98.8	85.9
Trebi	936	Y	4	2	4	8	2	3	8	8	8	------	8	2
		P	111.6	132.0	108.0	114.2	124.1	105.3	109.1	107.2	117.6	------	116.1	108.7
Han River	206	Y	4	3	4	9	3	3	8	9	8	8	------	3
		P	100.6	120.7	98.2	101.2	126.9	95.8	94.0	96.4	101.3	86.1	------	104.1
Wisconsin Winter	519	Y	2	3	2	3	3	2	2	3	2	2	3	------
		P	107.5	115.9	102.4	101.9	121.9	97.2	94.6	97.7	116.5	92.0	96.0	------

Barley is an important crop in southern Idaho as feed for stock. Several varieties that have been grown successfully at this substation have been distributed to farmers in the vicinity. The cultivation of one of these, Trebi (C. I. No. 936), has spread over a considerable area in the Snake River basin. The annual yields of the barley varieties grown in plats under irrigation from 1913 to 1921, inclusive, at Aberdeen, are shown in Table 67. These yields were obtained in cooperation with the Idaho Agricultural Experiment Station. While a number of ecological groups have been represented in these experiments, the varieties of the humid groups were not grown for a sufficient number of years to justify a group digest.

In the summarized digest of Table 67 12 important or representative varieties are compared. Trebi (C. I. No. 936) is undoubtedly the best of these. During the eight years in which it was grown it produced an average acre yield more than 5 bushels higher than that of Beldi Giant (C. I. No. 2777), its nearest competitor in those years. Trebi is a selection made from a bulk importation of barley from Samsun, Asiatic Turkey. From its behavior in southern Idaho it seems probable that it was originally grown under irrigation in one of the small valleys south of the Black Sea. Following Trebi are two North African barleys of the Coast group, Beldi Giant (C. I. No. 2777) and Sandrel (C. I. No. 937). Both of these have proved to be high-yielding sorts at a number of the western stations.

Hannchen (C. I. No. 531), a 2-rowed sort, is fourth in point of yield. Hannchen is one of the few 2-rowed spring varieties that has produced high yields in the Western States, particularly in the sections where the growing season is short and the moisture supply is fairly abundant either from rainfall or irrigation. Han River (C. I. No. 206) also produced comparatively high yields. White Smyrna (C. I. No. 910), which was the highest yielding variety at this station under dry-land conditions, was the lowest of the varieties grown under irrigation in the years 1914 to 1921, inclusive. Hannchen and White Smyrna usually are high-yielding sorts in the same general regions, Hannchen yielding better in years when there is more than the average rainfall and White Smyrna when there is less.

Odessa (C. I. No. 927) and the barleys of the Manchuria type were not tested for more than three years, as none of them is adapted to growing conditions in these arid regions. Horn (C. I. No. 926), a Chevalier variety with an average yield of 105 per cent of the weighted mean for the years 1914 to 1917, inclusive, was exceeded by the other 2-rowed varieties grown those years. Baker (C. I. No. 975) was introduced into the experiment in 1918 and was continued through 1921. This is also a pedigreed variety which was originally selected from the same bulk importation as Trebi. It has not proved so good at this station, however, as Trebi.

While the irrigated lands in southern Idaho are well adapted to the growing of barleys of the Coast type, such as Beldi Giant and Sandrel, and to the 2-rowed variety Hannchen, in nearly all of the places where Trebi has been grown it has proved superior to them.

Dry-land conditions.—Barley varieties were grown on dry land at the Aberdeen (Idaho) substation during the period from 1913 to 1918, inclusive. These yields, shown in Table 68, were obtained in cooperation with the Idaho Agricultural Experiment Station. Only two varieties were grown during the full period of the experiments. They were White Smyrna (C. I. No. 195) and Club Mariout (C. I. No. 261). These produced an average yield of 20.7 and 20.5 bushels, respectively, for the six years, so that they are essentially equal. Winter Club (C. I. No. 592) was grown from 1913 to 1916, inclusive, but was inferior to most of the spring barleys grown in those years. Although Hannchen (C. I. No. 531) was not grown in 1914, in the five years in which it was comparable it did not prove so good as White Smyrna or Club Mariout. Coast (C. I. No. 690) produced fairly good yields in 1913 and 1914, but was very poor in 1915 and consequently was dropped from the experiment the following year. Svanhals (C. I. No. 187) was grown for this same period, but is evidently not adapted to dry-farming conditions in southern Idaho.

TABLE 68.—*Annual acre yields of varieties of barley grown on dry land at the Aberdeen (Idaho) substation in part or all of the six years from 1913 to 1918, inclusive*

[Data obtained in cooperation with the Idaho Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1917	1918			
Winter Club	592	13.7	26.3	8.4	1.5	-------	-------	4	12.5	60.4
Nepal	230	16.0	-------	-------	-------	-------	-------	1	16.0	68.7
Bavarian	160	14.1	-------	-------	-------	-------	-------	1	14.1	60.5
Union	2198	15.3	-------	-------	-------	-------	-------	1	15.3	65.7
Do	2199	14.3	-------	-------	-------	-------	-------	1	14.3	61.4
Gatami	575	27.5	-------	-------	-------	-------	-------	1	27.5	118.0
Coast	690	28.3	38.1	10.1	-------	-------	-------	3	25.5	111.8
White Smyrna	195	30.4	35.4	19.1	24.1	10.0	5.4	6	20.7	121.8
Hannchen	531	27.3	-------	18.5	10.4	2.5	7.2	5	13.2	96.3
Hanna	906	21.4	-------	-------	-------	-------	-------	1	21.4	91.8
Club Mariout	261	43.8	35.5	13.5	17.0	7.9	5.2	6	20.5	120.6
Princess	529	15.8	-------	-------	-------	-------	-------	1	15.8	67.8
Manchuria	244	22.2	-------	-------	-------	-------	-------	1	22.2	95.3
Svanhals	187	35.4	28.6	11.2	-------	-------	-------	3	25.1	110.1
Winter Club	488	-------	27.0	-------	-------	-------	-------	1	27.0	80.4
Maryland Winter	518	-------	47.0	-------	-------	-------	-------	1	47.0	139.9
Tennessee Winter	257	-------	43.2	15.7	3.0	2.2	-------	4	16.0	95.8
Turkestan	711	-------	-------	3.9	-------	-------	-------	1	3.9	29.3
Moravian	343	-------	13.1	-------	-------	-------	-------	1	13.1	39.0
Lion	923	-------	42.0	14.6	13.9	6.6	4.9	5	16.4	108.6
Bulgarian	521	-------	-------	1.6	-------	-------	-------	1	1.6	120.3
Beldi Giant	2777	-------	-------	22.5	15.8	6.2	7.4	4	13.0	131.3
Sandrel	937	-------	-------	20.3	11.2	4.1	5.8	4	10.3	104.0
Trebi	936	-------	-------	-------	13.7	5.4	6.8	3	8.6	103.6

In 1914 three winter barleys, Winter Club (C. I. No. 488), Maryland Winter (C. I. No. 518), and Tennessee Winter (C. I. No. 257), were grown. Tennessee Winter was continued in the experiment through 1917. Turkestan (C. I. No. 711) and Bulgarian (C. I. No. 521), two other winter barleys, were grown in

1915. None of these winter sorts proved successful, owing to the severity of the winters at Aberdeen. Spring barley is commonly grown in southern Idaho, although at lower altitudes winter barley is sometimes grown successfully.

Lion (C. I. No. 923) produced an average yield of 108.6 per cent of the weighted mean for the years 1914 to 1918, inclusive. Beldi Giant (C. I. No. 2777) and Sandrel (C. I. No. 937) were grown from 1915 to 1918, inclusive. Beldi Giant was exceeded in yield by only White Smyrna for those years. While Sandrel ranked second in 1915, its yield was comparatively low the other three years. Trebi (C. I. No. 936) yielded fairly well in the three years it was grown, considering the fact that it is best adapted to irrigated conditions in this section.

From Table 68 it is evident that White Smyrna, Club Mariout, and Beldi Giant are about equally well adapted to culture under dry-land conditions. White Smyrna is perhaps the better sort in years of very little rainfall.

NEPHI, UTAH

Barley varieties were tested at Nephi, Utah, in the period from 1908 to 1921, inclusive. The yields shown in Table 69 were obtained in cooperation with the Utah Agricultural Experiment Station during the years from 1908 to 1920, inclusive, and through the courtesy of this station in 1921.

In 1908 three spring barleys, Hull-less (C. I. No. 649), California Prolific (C. I. No. 651), and Coast (C. I. No. 650), were grown. Although retained for several years none of these produced high yields.

Two winter barleys, Winter Club (C. I. No. 592) and Tennessee Winter (C. I. No. 257), were sown in the fall of 1908 and were continued in the experiment through 1921. In 1909 and 1910 they produced yields much higher than those of the three spring sorts just mentioned. A number of spring barleys were sown along with the winter varieties in 1911. As can be seen from the yields in 1912, the crop was practically a failure. However, Gatami (C. I. No. 575), a spring barley, produced the highest yield that year. It was the only spring variety tested further as a winter sort, having been grown in 1914, 1915, and 1916, when it proved inferior to the true winter sorts. With the exception of Turkestan (C. I. No. 711) the other winter barleys sown in the fall of 1911 were also dropped from the experiment after that year. Turkestan was grown through 1921. Bulgarian (C. I. No. 521) was tested for the years 1914 to 1921, inclusive, making possible a comparison of the four winter barleys, Winter Club, Tennessee Winter, Turkestan, and Bulgarian, for those eight years. Bulgarian, with an average yield of 33.7 bushels, was the best of these four. Turkestan was second, with Tennessee Winter and Winter Club third and fourth, respectively.

TABLE 69.—*Annual acre yields of varieties of barley grown at the Nephi (Utah) substation in one or more of the 14 years from 1908 to 1921, inclusive*

[Data for 1908 to 1920, inclusive, obtained in cooperation with the Utah Agricultural Experiment Station, through whose courtesy the data for 1921 are used. The varieties marked with an asterisk (*) were sown in the fall]

Variety	C. I. No.	Acre yields (bushels)														Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Hull-less	649	16.0	7.7	----	----	----	----	----	----	----	----	----	----	----	----	2	11.9	86.9
California Prolific	651	20.2	7.7	1.2	----	----	----	----	----	----	----	----	----	----	----	3	9.7	81.3
Coast	650	13.3	4.2	1.4	----	----	----	----	----	----	----	----	----	----	----	3	6.3	51.8
*Tennessee Winter	257	----	18.1	16.5	24.6	4.1	1.0	50.9	43.5	8.1	21.7	26.0	13.6	16.7	41.1	13	22.0	108.4
*Winter Club	592	----	22.0	9.8	32.7	4.6	0	39.8	53.5	12.7	16.7	20.1	13.6	16.7	36.2	13	21.4	105.4
*Nina	2196	----	----	----	22.5	----	----	----	----	----	----	----	----	----	----	1	22.5	84.6
*Virginia Hooded	648	----	----	----	----	1.4	----	----	----	----	----	----	----	----	----	1	1.4	41.2
*Black Hull-less	596	----	----	----	----	.6	----	----	----	----	----	----	----	----	----	1	.6	17.6
*Chevalier	156	----	----	----	----	3.9	----	----	----	----	----	----	----	----	----	1	3.9	114.7
*Orel	351	----	----	----	----	3.2	----	----	----	----	----	----	----	----	----	1	3.2	94.1
*Hannchen	531	----	----	----	----	4.0	----	----	----	----	----	----	----	----	----	1	4.0	117.6
*Turkestan	711	----	----	----	----	2.9	0	61.7	50.2	7.9	25.1	30.4	14.3	12.5	61.3	10	26.6	123.7
*Gatami	575	----	----	----	----	5.7	----	43.5	38.0	3.0	----	----	----	----	----	4	22.5	96.6
*Bulgarian	521	----	----	----	----	----	----	59.0	49.6	13.7	24.3	36.5	18.6	19.4	48.8	8	33.7	127.7
Coast	690	----	----	----	----	----	----	----	27.3	13.7	19.0	16.7	6.2	10.7	----	6	15.6	74.3
White Smyrna	195	----	----	----	----	----	----	----	29.5	16.8	23.3	11.9	7.3	9.1	----	6	16.3	77.6

Both Coast (C. I. No. 690) and White Smyrna (C. I. No. 195) were spring sown for the years 1915 to 1920, inclusive, but were surpassed by the four winter barleys for that period.

Nephi, which is located in an intermountain valley, is evidently better suited to the growing of winter than of spring varieties. The winter sorts are somewhat protected from extremes of temperature and ripen about 10 days before the spring varieties, thus escaping the drought which usually begins about June 1.

PULLMAN, WASH.

The results of barley tests at Pullman, Wash., for the period from 1914 to 1921, inclusive, were obtained through the courtesy of the Washington Agricultural Experiment Station. These data are found in Table 70. Ten spring and four winter varieties were tested.

Of the spring sorts Coast (C. I. No. 1249) produced the highest average yield. Beldi Giant (C. I. No. 2777) was almost the equal of Coast. Following Beldi Giant is Blue (C. I. No. 1247), which was grown for the seven years from 1915 to 1921, inclusive. Club Mariout (C. I. No. 261) ranked fourth in point of yield for the four years in which it was grown. All of these four varieties are of North African origin. Next in order is Horsford (C. I. No. 1775), which is noteworthy only because it produced a higher average yield than White Smyrna. Horsford, like Nepal, usually is one of the poorest sorts. Both Eureka (C. I. No. 1250) and Nepal (C. I. No. 595), 6-rowed, hooded, hull-less varieties, produced comparatively low yields.

Of the winter barleys grown for the eight years of the experiments Winter Club (C. I. No. 592) ranks first. It exceeded all the spring varieties for this period. When sown in spring, however, Winter Club did not compare favorably with the spring sorts. Following Winter Club are Wisconsin Winter (C. I. No. 519) and Maryland Winter (C. I. No. 518). Neither gave as high average yields as Coast or Beldi Giant. Wisconsin Winter (C. I. No. 1894) was first tested in 1919. It was inferior to Winter Club, but exceeded all other winter or spring varieties in the three years from 1919 to 1921, inclusive.

While the spring barleys undoubtedly are of more commercial importance, it is of especial interest that the winter barleys produce such high yields in the same locality. It is seldom that both types can be successfully grown in the same district. At Moscow, Idaho, only a few miles distant, the relative yield of the winter sorts was even higher. It is unlikely that their culture will be greatly increased in the near future, as the seeding time is the same as that of winter wheat, and labor is not often available for the extension of the fall-seeded acreage. The yields following severe winters drop very low.

TABLE 70.—*Annual acre yields of varieties of barley grown at the Washington Agricultural Experiment Station (at Pullman) in some or all of the eight years from 1914 to 1921, inclusive*

[Data obtained through the courtesy of the Washington Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915	1916	1917	1918	1919	1920	1921			
Spring barleys:												
Beldi Giant	2777	43.2	60.2	85.4	37.5	25.8	69.1	79.8	52.3	8	56.7	108.6
Coast	1249	49.2	57.8	89.6	37.1	28.4	65.0	72.5	55.2	8	56.9	109.0
Eureka	1250	36.7	45.9	65.0	20.3	16.9	50.9	57.9	33.5	8	40.9	78.4
Nepal	595	42.6	39.5	73.5	16.6	12.6	43.4	59.1	------	7	41.0	79.0
Excelsior	1248	40.7	47.7	68.7	------	------	------	------	------	3	52.4	91.8
Blue	1247	------	58.7	87.5	30.8	23.7	60.1	72.2	53.5	7	55.2	104.7
Winter Club	592	------	41.8	89.8	23.5	30.0	55.4	61.0	48.9	7	50.1	95.1
Horsford	1775	------	------	------	39.1	24.1	55.1	70.6	38.3	5	45.4	90.8
Club Mariout	261	------	------	------	------	25.0	56.0	65.4	63.3	4	52.4	98.1
White Smyrna	658	------	------	------	------	25.2	46.0	61.0	48.3	4	45.1	84.5
Winter barleys:												
Maryland Winter	518	50.6	76.3	40.8	38.6	24.5	61.8	70.2	53.5	8	52.0	99.6
Winter Club	592	68.9	59.4	24.6	47.1	16.7	88.2	91.2	65.6	8	57.7	110.5
Wisconsin Winter	519	49.9	63.4	40.4	36.8	24.1	88.8	72.4	65.0	8	55.1	105.6
Do	1894	------	------	------	------	------	93.7	73.1	75.8	3	80.9	128.4

LIND, WASH.

The yields of barley at the Adams Branch Experiment Station at Lind, Wash., were obtained in cooperation with the Washington Agricultural Experiment Station until the end of 1920 and through the courtesy of that station in 1921. These yields for the 5-year period from 1917 to 1921, inclusive, are shown in Table 71. Only two varieties, Coast (C. I. No. 1249) and White Smyrna (C. I. No. 910), were grown for the entire period. Coast was only slightly superior, with no significant difference, as its average yield was 13.8 bushels, as compared to 13.3 bushels for White Smyrna. The 2-rowed varieties, Hannchen (C. I. No. 531) and White Smyrna, are usually successful sorts in the same general localities, but Hannchen was surpassed by the other four varieties grown at this station from 1917 to 1919, inclusive. The two hooded barleys Eureka (C. I. No. 1250) and Excelsior (C. I. No. 1248) produced the lowest yields in 1917 and were discarded after that year. Meloy (C. I. No. 1176) and Himalaya (C. I. No. 620) were grown for the four years from 1918 to 1921, inclusive. Meloy was exceeded only by Coast in those years. This is a hooded hulled variety that has yielded well in recent years at a number of the western stations. Trebi (C. I. No. 936), which was grown in 1918 and 1919, was exceeded by both Coast and Meloy. Horsford (C. I. No. 1775) yielded 20.1 bushels in 1919, the highest that year, but was superior only to Himalaya the two following years.

The three winter barleys, Winter Club (C. I. No. 592), Hybrid (C. I. No. 3168), and Wisconsin Winter (C. I. No. 519), grown in 1918 and 1919, were very low in productivity. At Pullman both Winter Club and Wisconsin Winter were superior in yield, but it is evident that in this section of Washington the winters are too severe for the successful cultivation of these varieties.

Of the barleys tested at Lind three varieties of entirely different types did almost equally well. Coast, the 6-rowed bearded sort, is the one commonly grown in this section. White Smyrna, a 2-rowed bearded variety, has produced high yields at a number of western stations, but it has not gained a wide commercial reputation, because of its short straw and general appearance which are very much against it. Meloy, a 6-rowed hooded hull-less variety, has been only recently tested, but from its behavior at the various stations where it is grown it is likely that it will prove valuable in this section.

TABLE 71.—*Annual acre yields of varieties of barley grown at the Adams Branch Experiment Station, Lind, Wash., in part or all of the five years from 1917 to 1921, inclusive*

[Data obtained in cooperation with or through the courtesy of the Washington Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1917	1918	1919	1920	1921			
Club Mariout	932	13.9	7.0	13.1			3	11.3	104.6
Coast	1249	15.0	6.4	18.6	12.1	16.9	5	13.8	121.1
Blue	1247	13.3	6.4	16.7			3	12.1	112.0
Hannchen	531	12.5	6.0	15.6			3	11.4	105.6
White Smyrna	910	16.2	7.4	15.0	11.2	16.7	5	13.3	116.7
Eureka	1250	8.2					1	8.2	66.1
Excelsior	1248	8.0					1	8.0	64.5
Trebi	936		6.5	17.1			2	11.8	114.6
Meloy	1176		5.8	17.9	11.2	17.0	4	13.0	117.1
Himalaya	620		6.4	13.4	9.2	11.5	4	10.1	91.0
Winter Club (fall sown)	592		2.8	10.2			2	6.5	63.1
Hybrid (fall sown)	3168		1.3				1	1.3	24.5
Wisconsin Winter (fall sown)	519		2.2	10.6			2	6.4	62.1
Horsford	1775			20.1	10.8	13.4	3	14.8	104.2

MORO, OREG.

Varietal experiments with barley were conducted at the Sherman County Branch Station, Moro, Oreg., in cooperation with the Oregon Agricultural Experiment Station from 1910 to 1921, inclusive. The annual yields are reported in Table 72. Of the five groups compared, the Coast was far superior to the Hanna, which ranked second. The Tennessee Winter group was third, Manchuria fourth, and Hull-less fifth. No yields were recorded for the Tennessee Winter varieties in 1913. It is probable that they winterkilled that year. If so, this would lower the place of rank of the group.

TABLE 72.—*Annual acre yields of varieties of barley grown at the Sherman County Branch Station, Moro, Oreg., in part or all of the 12 years from 1910 to 1921, inclusive*

[Data obtained in cooperation with the Oregon Agricultural Experiment Station. The varieties in the table proper marked with an asterisk (*) were sown in the fall]

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Himalaya	620	14.7	2.9	6.0	----	----	----	----	----	----	----	----	----	3	7.9	53.4
Coast	626	14.1	2.6	23.3	38.3	32.5	51.2	72.5	36.5	20.4	----	----	----	9	32.4	102.5
Bohemian	188	14.4	----	----	----	----	----	----	----	----	----	----	----	1	14.4	137.1
Beldi Dwarf	190	14.3	3.5	15.5	37.5	36.2	48.8	59.9	35.8	21.5	38.1	40.6	42.1	12	32.8	101.5
Nepal	595	14.2	3.0	----	----	----	----	----	----	----	----	----	----	2	8.6	108.9
White Smyrna	658	14.1	9.3	27.0	42.0	36.7	49.8	71.8	38.0	22.8	35.0	30.4	37.7	12	34.5	106.8
Club Mariout	261	13.9	6.3	28.0	40.6	42.1	54.5	69.3	45.4	29.0	40.2	39.2	41.7	12	37.5	116.1
Hannchen	531	11.3	8.4	25.2	48.3	32.8	46.4	68.3	36.8	25.0	39.8	28.5	33.4	12	33.7	104.3
Oderbrucker	537	13.4	7.0	23.5	30.6	34.5	41.5	61.9	39.2	22.9	----	----	----	9	30.5	96.5
Horsford	610	13.4	5.4	24.5	14.4	20.8	22.5	----	----	----	----	----	----	6	16.8	63.9
Mansury	617	13.4	2.7	21.2	31.2	24.2	----	----	----	----	----	----	----	5	18.5	80.1
Princess	529	9.5	3.3	20.3	20.5	19.1	----	----	----	----	----	----	----	5	14.5	62.8
Evans	892	9.7	2.3	----	----	----	----	----	----	----	----	----	----	2	6.0	75.9
Hanna	24	5.6	10.0	26.0	29.5	26.9	40.0	----	----	----	----	----	----	6	23.0	87.5
Gatami	575	7.7	5.9	16.8	36.4	41.2	36.0	45.2	----	----	----	----	----	7	27.0	84.9
Svanhals	187	7.3	13.8	25.1	34.1	30.6	38.7	71.5	31.9	18.4	34.0	25.6	32.7	12	30.3	93.8
Black Hull-less	596	5.0	3.7	17.8	37.9	25.2	36.6	----	----	----	----	----	----	6	21.0	79.8
Chevalier II	200	3.1	6.4	26.2	31.0	21.8	32.5	----	----	----	----	----	----	6	20.2	76.8
Imperial	289	.9	4.3	25.0	17.3	----	----	----	----	----	----	----	----	4	11.9	64.3
Manchuria	244	----	.3	23.9	33.0	34.6	27.0	32.2	----	----	----	----	----	6	25.2	74.1
*Tennessee Winter	257	----	5.0	24.9	----	44.9	44.7	53.9	----	----	----	----	----	5	34.7	101.5
*Baku	709	----	.8	2.5	----	----	----	----	----	----	----	----	----	2	1.7	10.6
*Maryland Winter	518	----	8.3	26.0	----	51.7	46.1	56.1	----	----	----	----	----	5	37.6	109.9
*Wisconsin Winter	519	----	12.2	37.7	----	44.6	----	----	----	----	----	----	----	3	31.5	134.0
*Texas Winter	554	----	11.0	22.5	----	59.4	46.5	67.5	----	----	----	----	----	5	41.4	121.1
*Winter Club	592	----	11.0	21.1	----	35.0	30.4	60.9	----	----	----	----	----	5	31.7	92.7
*Chevalier	612	----	7.7	28.3	----	51.0	39.0	51.4	----	----	----	----	----	5	35.5	103.8
*Nesbian	647	----	----	34.8	----	42.3	----	----	----	----	----	----	----	2	38.5	131.4
*Turkestan	711	----	----	22.7	----	----	----	----	----	----	----	----	----	1	22.7	97.8
*Chevalier	156	----	----	25.4	----	34.2	----	----	----	----	----	----	----	2	29.8	101.7
*Bavarian	159	----	----	22.0	----	33.9	----	----	----	----	----	----	----	2	27.9	95.2
*Orel	351	----	----	21.0	----	40.2	----	----	----	----	----	----	----	2	30.6	104.4
*Hannchen	531	----	----	32.0	----	50.6	----	----	----	----	----	----	----	2	41.3	141.0
*Phoson	516	----	----	34.1	----	----	----	----	----	----	----	----	----	1	34.1	147.0
*Gatami	575	----	----	29.0	----	48.7	----	----	----	----	----	----	----	2	38.9	132.8
*Hansee Hull-less	703	----	----	20.7	----	----	----	----	----	----	----	----	----	1	20.7	89.2
*Black Hull-less	596	----	----	21.2	----	39.2	----	----	----	----	----	----	----	2	30.2	103.1
*Virginia Hooded	648	----	----	13.1	----	30.8	----	----	----	----	----	----	----	2	21.9	74.7
Bevede	2295	----	----	20.7	33.1	23.3	27.0	----	----	----	----	----	----	4	26.0	79.8
Manchuria	1275	----	----	22.3	25.4	----	----	----	----	----	----	----	----	2	23.9	89.8
O. A. C. 21	1470	----	----	----	34.0	23.4	----	----	----	----	----	----	----	2	28.7	84.2
Manchuria	241	----	----	----	34.3	25.4	----	----	----	----	----	----	----	2	29.9	87.7
Manchurian	739	----	----	----	38.7	29.2	27.2	----	----	----	----	----	----	3	31.7	87.3
Black Algerian	2296	----	----	----	----	46.3	46.4	37.5	----	----	----	----	----	3	43.4	95.8
Chile Brewing	2297	----	----	----	----	23.7	47.5	69.2	34.4	----	----	----	----	4	43.7	99.1
Himalaya	2298	----	----	----	----	33.3	39.3	----	----	----	----	----	----	2	36.3	97.1
Do	2299	----	----	----	----	25.0	42.2	66.8	37.9	24.8	40.1	29.8	36.0	8	37.8	94.7
Black Abyssinian	2300	----	----	----	----	24.3	----	----	----	----	----	----	----	1	24.3	69.8
Franconian	679	----	----	----	----	29.2	47.5	66.1	29.0	----	----	----	----	4	42.9	97.3
Coast	2301	----	----	----	----	37.9	42.6	67.1	40.6	18.8	43.1	31.0	38.4	8	39.9	100.0
Peru	2302	----	----	----	----	40.4	48.3	60.9	45.0	22.3	46.9	38.3	41.7	8	43.0	107.8
Mahan	1144	----	----	----	----	----	36.0	----	----	----	----	----	----	1	36.0	88.2
Withycombe	2303	----	----	----	----	----	36.5	59.4	----	----	----	----	----	2	47.9	91.4
Meloy	1176	----	----	----	----	----	51.1	63.9	47.5	18.6	52.5	36.2	34.8	7	43.5	105.1
*Dufur	2304	----	----	----	----	----	40.8	56.4	----	----	----	----	----	2	48.6	92.7
Servian	915	----	----	----	----	----	----	55.0	----	----	----	----	----	1	55.0	85.4
Horn	926	----	----	----	----	----	----	79.6	34.6	----	----	----	----	2	57.1	105.9
Odessa	927	----	----	----	----	----	----	81.7	37.5	19.0	44.2	18.8	36.3	6	39.6	95.4
Peruvian	935	----	----	----	----	----	----	77.5	43.7	24.1	44.4	39.3	43.4	6	45.4	109.4
Trebi	936	----	----	----	----	----	----	95.8	27.5	24.2	47.3	28.5	34.4	6	42.9	103.4
Sandrel	937	----	----	----	----	----	----	84.2	34.6	21.7	37.9	23.5	----	5	40.4	95.7
Hanna	906	----	----	----	----	----	----	69.6	32.8	19.0	37.5	26.9	26.4	6	35.4	85.3
Flynn	1311	----	----	----	----	----	----	----	----	21.7	44.6	37.9	38.8	4	35.7	110.5
White Smyrna	2169	----	----	----	----	----	----	----	----	----	----	27.5	40.6	2	34.1	102.4
Ace	1853	----	----	----	----	----	----	----	----	----	----	17.5	----	1	17.5	58.1
Beldi Giant	2777	----	----	----	----	----	----	----	----	----	----	21.6	----	1	21.6	71.8
California Mariout	1455	----	----	----	----	----	----	----	----	----	----	----	33.3	1	33.3	90.0

TABLE 72.—*Annual acre yields of varieties of barley grown at the Sherman County Branch Station, Moro, Oreg., in part or all of the 12 years from 1910 to 1921, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 13 REPRESENTATIVE VARIETIES

[*Explanation*.—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years. Under "Data shown" P= Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown	Varieties and percentages												
			Chevalier II	Svanhals	Hannchen	Coast	Peruvian	Club Mariout	White Smyrna	Beldi Dwarf	Trebi	Himalaya	Meloy	Flynn	Texas Winter
Chevalier II	200	Y	-----	6	6	6	(*)	6	6	6	(*)	2	1	(*)	4
		P	-----	80.9	70.2	74.7	-----	65.3	67.6	77.7	-----	80.8	63.6	-----	62.3
Svanhals	187	Y	6	-----	12	9	6	12	12	12	6	8	7	4	5
		P	123.6	-----	90.0	93.1	78.6	80.8	87.7	92.4	83.1	93.7	83.0	77.4	86.9
Hannchen	531	Y	6	12	-----	9	6	12	12	12	6	8	7	4	5
		P	142.5	111.1	-----	103.8	85.1	89.8	97.5	102.6	89.9	102.8	91.3	88.6	87.5
Coast	626	Y	6	9	9	-----	3	9	9	9	3	5	4	1	5
		P	133.9	107.4	96.3	-----	89.1	88.5	93.5	106.7	87.7	108.3	99.7	94.0	88.0
Peruvian	935	Y	(*)	6	6	3	-----	6	6	6	6	6	6	4	1
		P	-----	127.2	117.5	112.3	-----	102.9	115.6	114.5	105.7	115.7	107.5	105.7	114.8
Club Mariout	261	Y	6	12	12	9	6	-----	12	12	6	8	8	4	5
		P	153.2	123.8	111.4	112.9	97.2	-----	108.6	114.3	102.8	119.4	104.8	105.0	96.8
White Smyrna	658	Y	6	12	12	9	6	12	-----	12	6	8	7	4	5
		P	147.9	114.0	102.6	106.9	86.5	92.1	-----	105.3	91.5	106.5	93.7	88.0	94.1
Beldi Dwarf	190	Y	6	12	12	9	6	12	12	-----	6	8	7	4	5
		P	128.8	108.3	97.4	93.7	87.4	87.5	95.0	-----	92.4	106.7	94.2	99.5	79.2
Trebi	936	Y	(*)	6	6	3	6	6	6	6	-----	6	6	4	1
		P	-----	120.4	111.2	114.0	94.6	97.3	109.3	108.3	-----	109.5	101.7	94.0	141.9
Himalaya	2299	Y	2	8	8	5	6	8	8	8	6	-----	7	4	3
		P	123.8	106.8	97.3	92.3	86.4	83.7	93.9	93.7	91.3	-----	91.1	91.4	77.3
Meloy	1176	Y	1	7	7	4	6	7	7	7	6	7	-----	4	2
		P	157.2	120.5	109.5	100.3	93.1	95.4	106.7	106.2	98.4	109.7	-----	99.4	100.9
Flynn	1311	Y	(*)	4	4	1	4	4	4	4	4	4	4	-----	(*)
		P	-----	129.2	112.9	106.4	94.6	95.3	113.6	100.5	106.4	109.4	100.6	-----	-----
Texas Winter	554	Y	4	5	5	5	1	5	5	5	1	3	2	(*)	-----
		P	160.4	115.1	114.2	113.6	87.1	103.3	106.3	126.2	70.5	129.4	99.1	-----	-----

Thirteen representative varieties are compared in the summarized digest of Table 72. Of these, Peruvian (C. I. No. 935) produced the highest yields. It is a North African barley of the Coast group. Second in point of yield was Club Mariout (C. I. No. 261), also a North African barley but not of the Coast type. Trebi (C. I. No. 936) produced very high yields. Considering the low precipitation in this part of the Columbia Basin it would hardly be expected that Trebi would be so successful here. However, the soil in this region absorbs water quite readily and has a high capacity for retaining it. Following Trebi are two hybrid sorts, Flynn (C. I. No. 1311) and Meloy (C. I. No. 1176), both of which have been distributed from the Moro station. Flynn is a smooth-awned barley and Meloy a hooded one. The stiff awns of barley cause many farmers to object to its cultivation. The smooth-awned and hooded sorts are not open to this objection. Flynn came from a cross of a smooth-awned barley on Club Mariout, which parent it has almost equaled in yield. Meloy is by far the best of the hooded barleys widely tested in the West, producing higher yields and shattering less than any other hooded hybrid.

In the earlier years a number of winter barleys were grown, but they were all dropped from the experiments after 1916. Texas Winter (C. I. No. 554) produced the highest average yield of those tested for five years. While a small acreage of winter barley is grown successfully in this basin, the possibilities of winterkilling are too great for the crop to become of much commercial importance.

White Smyrna (C. I. No. 658) was grown for the full 12 years of the experiments, producing an average yield of 107 per cent of the weighted mean. Hannchen (C. I. No. 531) was also grown during the entire period, giving an average yield of 104 per cent of the weighted mean. Beldi Dwarf (C. I. No. 190) produced fair yields, but was not so good as either of the two just mentioned for the 12 years.

As can be seen from Table 72, the humid-area spring varieties, such as the 6-rowed Manchuria, Oderbrucker, and Odessa and the 2-rowed sorts, Princess, Hanna, and Chevalier, are entirely out of their ecological range. From the results at Moro it may be seen that the North African barleys, particularly those of the Coast group, and Club Mariout, are the ones best adapted to this region. Coast has been the common barley grown in this section for many years.

UNION, OREG.

Table 73 shows the varietal yields of barley grown at the Eastern Oregon Branch Station (at Union) in seven of the years from 1910 to 1921, inclusive. Because of the varying periods in which some of the barleys were grown, a varietal comparison is almost impossible. The plats also varied greatly in size, thus making conclusions less dependable than if they had been uniform. In 1910 all the higher yielding varieties except Beardless (C. I. No. 639) were selections made at this station. Two hybrids of the Nepal type, Union (C. I. Nos. 2198 and 2199), produced high average yields in the four years they were grown. Blue (C. I. No. 1247), a barley of the Coast type, is the only variety tested for as many as six years. It produced an average yield of 102 per cent of the weighted mean. Of the varieties grown during the more recent period, 1919 to 1921, inclusive, Trebi (C. I. No. 936) is perhaps the best. Hannchen (C. I. No. 531) produced an average yield of 98 per cent of the weighted mean. The 2-rowed varieties, Horn (C. I. No. 926) and White Smyrna (C. I. No. 910), yielded well in 1919 and 1920. Club Mariout (C. I. No. 261) and Flynn (C. I. No. 1311), which were introduced in 1921, were the best varieties that year.

TABLE 73.—*Annual acre yields of varieties of barley grown at the Eastern Oregon Branch Station (at Union) in one or more of the years from 1910 to 1921, inclusive*

[Data furnished through the courtesy of the Oregon Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1914	1919	1920	1921			
Beardless	639	56.5	42.6	44.6	49.2	------	------	28.5	5	44.3	101.8
Gutekorn	606	41.5	------	------	54.4	------	------	------	2	47.9	103.9
Marsbury	3121	40.8	------	------	47.3	26.3	55.1	------	4	42.4	98.1
Blue	1247	38.2	32.8	51.1	62.0	27.4	46.3	------	6	43.0	101.9
Primus	532	36.5	------	------	------	------	------	------	1	36.5	79.0
Highland Chief	883	34.9	------	------	------	------	------	------	1	34.9	75.5
Princess	529	32.8	------	------	52.7	20.0	------	------	3	35.2	84.8
Chevalier II	200	32.6	------	------	55.1	17.8	------	------	3	35.2	84.8
Svanhals	187	32.5	------	------	------	------	------	------	1	32.5	70.3
Sexradigt	607	25.9	------	------	------	------	------	------	1	25.9	56.1
Black Hull-less	596	20.3	------	------	------	------	------	------	1	20.3	43.9
Union	3122	57.1	45.6	26.7	------	------	------	------	3	43.1	99.8
Do	3123	58.8	44.1	------	------	------	------	------	2	51.5	113.7
Do	3179	50.8	38.2	------	------	------	------	------	2	44.5	98.2
Do	2198	63.7	65.2	28.1	46.7	------	------	------	4	50.9	116.5
Do	3124	63.9	58.3	------	------	------	------	------	2	61.1	134.9
Do	3127	54.6	42.0	------	------	------	------	------	2	48.3	106.6
Do	3125	53.7	36.4	------	------	------	------	------	2	45.1	99.6
Do	3126	46.9	28.6	------	------	------	------	------	2	37.7	83.2
Do	3128	50.6	45.8	------	------	------	------	------	2	48.2	106.4
Do	3129	51.5	43.3	------	------	------	------	------	2	47.4	104.6
Do	3130	50.7	33.6	35.6	36.4	------	------	------	4	39.1	89.5
Do	2199	58.7	68.4	34.5	39.1	------	------	------	4	50.2	114.9
Do	3131	50.9	------	------	23.1	------	------	------	2	37.0	80.3
Do	3132	41.8	------	------	49.8	------	------	------	2	45.8	99.3
Do	3134	56.0	33.7	22.1	------	------	------	------	3	37.3	86.3
Do	3133	------	39.8	21.2	------	------	------	------	2	30.5	76.1
New Hull-less	3135	------	------	39.7	35.6	------	------	------	2	37.7	92.6
Odessa	927	------	------	------	------	23.6	52.3	31.0	3	35.6	93.2
Sandrel	937	------	------	------	------	25.7	51.7	------	2	38.7	102.4
White Smyrna	910	------	------	------	------	26.7	56.4	------	2	41.5	109.8
Hannchen	531	------	------	------	------	26.0	48.1	------	2	37.1	98.1
Trebi	936	------	------	------	------	32.6	64.4	41.1	3	46.0	120.4
Horn	926	------	------	------	------	31.9	52.1	------	2	42.0	111.1
Peruvian	935	------	------	------	------	21.0	45.5	------	2	33.3	88.1
Nepal	595	------	------	------	------	42.2	------	------	1	42.2	157.5
Flynn	1311	------	------	------	------	------	------	45.8	1	45.8	114.2
Club Mariout	261	------	------	------	------	------	------	54.2	1	54.2	135.2

Although the barleys grown in recent years at Union have not been tested sufficiently to show their relative value, the behavior of Trebi, Club Mariout, and Flynn here and in other sections of Oregon indicates that they would be desirable sorts to grow.

BURNS, OREG.

Dry-land conditions.—The yields of barley varieties grown on dry land at the Harney Valley Branch Station, Burns, Oreg., were obtained in cooperation with the Oregon Agricultural Experiment Station for the seven years from 1913 to 1919, inclusive, and through the courtesy of that station for the years 1920 and 1921. Burns is situated in an old lake bed on a high plateau between the mountain ranges. The annual precipitation is low, and although there are no such extreme climatic changes as in the humid States frosts may occur in any month of the year. Because of this fact and the low rainfall, there is only one good crop in about every three on the dry land. The yields of varieties tested on dry land are shown in Table 74.

In the summarized digest of Table 74 a comparison of 12 well-known varieties is shown. The 2-rowed sorts, Hannchen (C. I. No. 531) and White Smyrna (C. I. No. 195), produced the highest yields. The data in Table 74 indicate that Hannchen was usually the better of the two in the years of heavier rainfall and that in the drier years the reverse was true. Following White Smyrna was Coast (C. I. No. 690), which was the best of the 6-rowed barleys compared. Svanhals (C. I. No. 187) was fourth in point of yield. Winter Club (C. I. No. 592) grown as a spring variety gave fair results. It was the poorest of the varieties compared, however, when fall sown. As can be seen from this table, the barleys of the Manchuria group are entirely out of their region of adaptation. The hooded and hull-less varieties, Horsford (C. I. No. 610), Nepal (C. I. No. 595), and Black Hull-less (C. I. No. 596), also produced very low yields.

In the fall of 1912 two spring and four winter varieties were sown. They produced low yields as compared with the spring-sown varieties, probably owing to both lack of precipitation and partial winterkilling. Winter Club (C. I. No. 592) and Tennessee Winter (C. I. No. 257) were the only fall-sown varieties tested further. Neither of these could compete at all with those which were spring sown. Trebi (C. I. No. 936) was grown in 1919 and 1920, but it is evident that it can not succeed here without irrigation.

Hannchen and White Smyrna are unquestionably the superior varieties on the dry lands. At the stations in eastern Oregon the 2-rowed varieties have yielded relatively higher than elsewhere in the region west of the Rocky Mountains although they have been promising at many other places.

Irrigated land.—Barley varieties have been tested on irrigated land at the Harney Valley Branch Station, Burns, Oreg., for the five years from 1917 to 1921, inclusive. The data were obtained in cooperation with the Oregon Agricultural Experiment Station for the years 1917 to 1919, inclusive, and through the courtesy of that station for the years 1920 and 1921. The annual yields of these barleys are found in Table 75. While it is difficult to compare the varieties when grown for such varying periods of years, it is obvious that Hannchen (C. I. No. 531), White Smyrna (C. I. No. 658), and Trebi (C. I. No. 936) were superior sorts at this station when tested under irrigation. Coast (C. I. No. 690) was inferior to these varieties in all the years for which it was comparable with them with the exception of 1920, when it gave the unusually high yield of 81.3 bushels, the highest in that year. Svanhals (C. I. No. 187) was fourth in point of yield. Under irrigation, Winter Club (C. I. No. 592) was quite successful when spring sown. It gave the highest average yield of all the varieties grown during the years 1917, 1920, and 1921. Trebi (C. I. No. 936) was tested only in the years 1919 and 1920 but gave the highest average for those years. The hooded barleys Nepal (C. I. No. 595) and Horsford (C. I. No. 610) were inferior in yield.

While both Trebi and Winter Club are promising sorts, their values are not so well established as those of Hannchen and White Smyrna.

TABLE 74.—*Annual acre yields of varieties of barley grown on dry land at the Harney Valley Branch Station, Burns, Oreg., in one or more of the nine years from 1913 to 1921, inclusive*

[Data for the years 1913 to 1917 and also 1919 were obtained in cooperation with the Oregon Agricultural Experiment Station through whose courtesy data for the years 1920 and 1921 were furnished. The varieties marked with an asterisk (*) were sown in the fall]

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1914	1915	1916	1917	1919	1920	1921			
Svanhals	187	41.9	10.8	6.3	35.8	19.9	5.1	31.6	12.0	8	20.4	121.4
Hannchen	531	40.0	13.3	9.2	49.8	16.5	3.5	31.4	18.0	8	22.7	135.1
O. A. C. 21	1470	33.3	10.0	5.0	------	------	------	------	------	3	16.1	103.9
Coast	690	32.5	13.7	11.7	44.9	13.5	8.4	27.2	19.7	8	21.5	128.0
White Smyrna	658	24.0	20.3	17.5	33.5	19.9	7.5	31.9	------	7	22.1	130.8
Oderbrucker	537	28.3	------	------	------	------	------	------	------	1	28.3	134.8
Hanna	24	25.0	12.7	15.5	------	------	------	------	------	3	17.7	114.2
Black Hull-less	596	26.7	11.3	7.5	11.2	------	------	------	------	4	14.2	84.0
Manchuria	1275	24.2	7.7	16.4	9.2	------	------	------	------	4	14.4	85.2
Do	244	20.9	------	------	------	------	------	------	------	1	20.9	99.5
Imperial	289	20.0	7.9	9.2	------	------	------	------	------	3	12.4	80.0
Black Hull-less	735	18.3	------	------	------	------	------	------	------	1	18.3	87.1
Club Mariout	261	20.0	14.8	13.0	34.8	17.8	------	------	------	5	20.1	120.4
Chevalier II	200	17.5	9.2	26.2	------	------	------	------	------	3	17.6	113.5
Oderbrucker	1146	17.5	------	------	------	------	------	------	------	1	17.5	83.3
Gatami	575	17.5	8.5	13.4	------	------	------	------	------	3	13.1	84.5
Silver King	905	14.2	------	------	------	------	------	------	------	1	14.2	67.6
Nepal	595	10.8	5.5	14.3	10.4	------	------	17.3	11.0	6	11.5	65.0
Beldi Dwarf	190	10.8	------	------	------	------	------	------	------	1	10.8	51.4
Winter Club	592	30.2	8.1	25.2	31.7	8.9	------	26.7	19.7	7	21.5	122.9
*Winter Club	592	16.2	.8	5.8	2.5	------	------	------	------	4	6.3	37.3
*O. A. C. Winter	3181	13.1	------	------	------	------	------	------	------	1	13.1	62.4
*Tennessee Winter	257	12.9	.8	5.8	------	------	------	------	------	3	6.5	41.9
*Nesbian	647	12.5	------	------	------	------	------	------	------	1	12.5	59.5
*Gatami	575	5.9	------	------	------	------	------	------	------	1	5.9	28.1
*Hannchen	531	5.0	------	------	------	------	------	------	------	1	5.0	23.8
Horsford	610	28.3	9.8	13.6	------	6.9	------	17.3	------	5	15.2	92.1
Gutekorn	606	------	------	------	15.0	------	------	------	------	1	15.0	62.8
Primus	532	------	------	------	7.5	------	------	------	------	1	7.5	31.4
Trebi	936	------	------	------	------	------	6.4	22.6	------	2	14.5	82.4
Coast	2305	------	------	------	------	------	9.7	------	------	1	9.7	142.6

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 12 REPRESENTATIVE VARIETIES

[Under "Data shown" P=Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown	Varieties and percentages											
			Chevalier II	Svanhals	Hanna	Hannchen	Manchuria	Coast	Club Mariout	White Smyrna	Nepal	Horsford	Winter Club	* Winter Club
Chevalier II	200	Y	------	3	3	3	3	3	3	3	3	3	3	3
		P	------	89.7	99.4	84.6	109.5	91.4	110.7	85.6	172.9	102.3	83.3	232.0
Svanhals	187	Y	3	------	3	8	4	8	5	7	6	5	7	4
		P	111.5	------	110.9	89.9	164.9	95.2	114.2	97.9	199.7	145.6	105.2	374.7
Hanna	24	Y	3	3	------	3	3	3	3	3	3	3	3	3
		P	100.6	90.2	------	85.1	110.1	91.9	111.3	86.1	173.9	102.9	83.8	233.3
Hannchen	531	Y	3	8	3	------	4	8	5	7	6	5	7	4
		P	118.1	111.2	117.5	------	195.3	105.9	128.3	105.9	233.3	145.5	118.4	443.9
Manchuria	1275	Y	3	4	3	4	------	4	4	4	4	3	4	4
		P	91.3	60.7	90.8	51.2	------	55.9	69.6	60.3	140.2	93.4	60.4	227.3
Coast	690	Y	3	8	3	8	4	------	5	7	6	5	7	4
		P	109.5	105.0	108.8	94.4	178.8	------	115.8	98.3	216.0	129.9	108.4	406.3
Club Mariout	261	Y	3	5	3	5	4	5	------	5	4	4	5	4
		P	90.4	87.5	89.8	78.0	143.7	86.3	------	87.2	201.5	111.9	96.4	326.5
White Smyrna	658	Y	3	7	3	7	4	7	5	------	5	5	6	4
		P	116.8	102.1	116.2	94.4	165.7	101.8	114.7	------	218.2	149.7	112.5	376.7
Nepal	595	Y	3	6	3	6	4	6	4	5	------	4	6	4
		P	57.8	50.1	57.5	42.9	71.3	46.3	49.6	45.8	------	69.4	48.9	162.1
Horsford	610	Y	3	5	3	5	3	5	4	5	4	------	5	3
		P	97.7	68.7	97.2	68.8	107.0	77.0	89.3	66.8	144.1	------	76.6	226.8
Winter Club	592	Y	3	7	3	7	4	7	5	6	6	5	------	4
		P	120.0	95.1	119.4	84.5	165.6	92.2	103.7	88.9	204.3	130.6	------	376.3
*Winter Club	592	Y	3	4	3	4	4	4	4	4	4	3	4	------
		P	43.1	26.7	42.9	22.5	44.0	24.6	30.6	26.6	61.7	44.1	26.6	------

TABLE 75.—*Annual acre yields of varieties of barley grown on irrigated land at the Harney Valley Branch Station, Burns, Oreg., in part or all of the five years from 1917 to 1921, inclusive*

[Data for years 1917, 1918, and 1919 were obtained in cooperation with the Oregon Agricultural Experiment Station, through whose courtesy the data for 1920 and 1921 were furnished]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1917	1918	1919	1920	1921			
White Smyrna	658	17.5	43.0	35.6	75.0	--------	4	42.8	106.5
Svanhals	187	11.0	38.5	--------	61.4	50.0	4	40.2	95.9
Hannchen	531	17.9	40.0	49.1	63.0	55.0	5	45.0	107.7
Coast	690	12.5	35.7	27.9	81.3	43.1	5	40.1	95.9
Winter Club	592	7.9	--------	--------	80.9	70.3	3	53.0	121.8
Club Mariout	261	13.9	--------	--------	--------	--------	1	13.9	110.3
Horsford	610	7.5	--------	--------	35.5	--------	2	21.5	51.8
Coast	2305	--------	32.0	--------	--------	--------	1	32.0	88.2
Nepal	595	--------	28.5	--------	58.3	30.7	3	39.2	75.2
Trebi	936	--------	--------	52.0	67.3	--------	2	59.7	104.7
Blackhull	878	--------	--------	--------	53.1	--------	1	53.1	83.0

NEWLANDS, NEV.

The results of varietal experiments at the Newlands Experiment Farm are used through the courtesy of the Office of Western Irrigation Agriculture. The yields of these varieties for the period from 1915 to 1919, inclusive, are shown in Table 76. Four of the seven varieties tested were grown during the entire period. Coast (C. I. No. 626) was the best of these. It produced an average yield of 34.6 bushels, which was 7.6 bushels higher than that of Hannchen (C. I. No. 531), its nearest competitor. Kent (C. I. No. 2644), a local barley of the Coast type, also was superior to Hannchen for the four years from 1915 to 1918, inclusive. It was exceeded only by Coast in that period. Besides Hannchen, two other 2-rowed varieties, Svanhals (C. I. No. 187) and Chevalier (C. I. No. 1142), were grown. They do not compare favorably with the two Coast barleys. Nepal (C. I. No. 595) was the lowest yielding sort. Trebi (C. I. No. 936), grown in the years from 1917 to 1919, inclusive, excelled all other varieties for those years with the exception of Coast.

It is quite obvious that the 2-rowed varieties are not superior here. The barleys of the Coast type are outstanding in yield at Newlands.

TABLE 76.—*Annual acre yields of varieties of barley grown at the Newlands (Nev.) Experiment Farm in some or all of the five years from 1915 to 1919, inclusive*

[Data used through the courtesy of the Office of Western Irrigation Agriculture]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1915	1916	1917	1918	1919			
Coast	626	42.5	36.8	20.4	50.7	22.4	5	34.6	126.3
Svanhals	187	29.9	29.3	17.5	34.8	16.8	5	25.7	93.8
Hannchen	531	32.9	30.3	21.7	34.3	16.0	5	27.0	98.5
Nepal	595	25.4	26.9	10.6	32.7	9.6	5	21.0	76.6
Kent	2644	29.9	39.9	20.5	32.0	--------	4	30.6	102.3
Chevalier	1142	--------	31.3	17.4	35.9	17.6	4	25.5	96.2
Trebi	936	--------	--------	23.6	40.1	18.9	3	27.5	111.3

CHICO, CALIF.

Varietal tests of barley were conducted at Chico, Calif., from 1910 to 1921, inclusive. This work was done in cooperation with the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture. The annual yields from the varietal tests are given in Table 77. Although in recent years plats have been replicated, the results at Chico were not entirely satisfactory, as the soil used was not sufficiently uniform to give wholly satisfactory results.

TABLE 77.—*Annual acre yields of varieties of barley grown at the United States Plant Introduction Garden, Chico, Calif., in part or all of the 12 years from 1910 to 1921, inclusive*

[Data obtained in cooperation with the Office of Foreign Seed and Plant Introduction]

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Beldi Dwarf	190	13. 8	58. 4	50. 0	41. 2	47. 0	26. 6	49. 2	52. 0	58. 5	47. 7	65. 7	28. 4	12	44. 9	110. 6
Telli	194	18. 0	60. 8	60. 0	41. 2	40. 3	23. 0	----	----	----	----	----	----	6	40. 5	102. 8
White Smyrna	195	25. 3	59. 2	56. 7	54. 0	43. 5	21. 5	55. 7	46. 4	48. 6	48. 6	49. 4	20. 8	12	44. 1	108. 6
Club Mariout	261	13. 0	32. 4	66. 7	37. 5	----	----	48. 2	50. 6	61. 8	58. 6	63. 2	30. 2	10	46. 2	102. 4
Coast	626	13. 3	66. 3	60. 0	47. 3	47. 9	24. 3	64. 8	54. 1	63. 4	36. 5	62. 5	35. 2	12	48. 0	118. 2
Tennessee Winter	257	----	60. 0	----	----	----	----	----	38. 7	59. 1	31. 8	48. 8	26. 3	6	44. 1	102. 1
Maryland Winter	518	----	83. 2	90. 0	66. 7	----	----	----	----	----	----	----	----	3	80. 0	152. 7
Wisconsin Winter	519	----	52. 8	83. 3	----	----	----	----	----	----	----	----	----	2	68. 1	125. 6
Nepal	22	----	41. 2	53. 3	----	----	----	----	----	----	----	----	----	2	47. 3	87. 3
Chevalier	278	----	44. 8	60. 0	32. 3	----	----	57. 7	45. 7	46. 3	28. 9	----	----	7	45. 1	95. 3
Poda	652	----	43. 6	60. 0	45. 0	31. 1	29. 3	64. 6	55. 5	59. 2	60. 4	52. 6	32. 8	11	48. 6	118. 2
Peru	653	----	68. 0	60. 0	51. 0	----	----	----	----	----	----	----	----	3	59. 7	113. 9
Coast	691	----	94. 4	50. 0	----	----	----	----	----	----	----	----	----	2	72. 2	133. 2
Bavarian	159	----	----	33. 3	45. 0	----	----	----	----	----	----	----	----	2	39. 1	77. 1
Black Algerian	708	----	----	56. 7	33. 3	----	----	----	----	----	----	----	----	2	45. 0	88. 8
Abyssinia	361	----	----	60. 0	64. 5	63. 7	25. 0	47. 4	25. 3	30. 0	24. 0	----	----	8	42. 5	105. 5
Popeline	704	----	----	43. 3	51. 7	----	----	----	----	----	----	----	----	2	47. 5	93. 7
Princess	529	----	----	63. 3	57. 7	----	----	----	----	----	----	----	----	2	60. 5	119. 3
Hannchen	531	----	----	73. 3	57. 0	----	27. 7	33. 7	33. 0	35. 1	36. 2	54. 4	----	8	43. 8	105. 3
Orel	351	----	----	53. 3	45. 7	----	----	----	----	----	----	----	----	2	49. 5	97. 6
Chevalier	156	----	----	60. 0	38. 3	----	----	----	----	----	----	----	----	2	49. 1	96. 8
Hankow	197	----	----	26. 7	----	----	----	----	----	----	----	----	----	1	26. 7	51. 1
Nepal	234	----	----	46. 7	----	----	----	41. 7	----	----	----	----	----	2	44. 2	90. 8
Abyssinia	355	----	----	36. 7	----	----	----	----	----	----	----	----	----	1	36. 7	70. 2
Gatami	575	----	----	60. 0	----	----	----	----	----	----	----	----	----	1	60. 0	114. 7
Golden Grain	588	----	----	60. 0	----	----	----	----	----	----	----	----	----	1	60. 0	114. 7
Black Hull-less	596	----	----	50. 0	----	----	----	----	----	----	----	----	----	1	50. 0	95. 6
Nesbian	647	----	----	36. 7	----	----	----	----	----	----	----	----	----	1	36. 7	70. 2
Virginia Hooded	648	----	----	16. 7	----	----	----	----	----	----	----	----	----	1	16. 7	31. 9
Hansee Hull-less	703	----	----	33. 3	----	----	----	----	----	----	----	----	----	1	33. 3	63. 7
Black Russian	705	----	----	40. 0	----	----	----	38. 0	----	----	----	----	----	2	39. 0	80. 1
Turkestan	711	----	----	46. 7	----	----	----	----	----	----	----	----	----	1	46. 7	89. 3
Black Hull-less	735	----	----	26. 7	----	----	----	----	----	----	----	----	----	1	26. 7	51. 1
Nepal	2315	----	----	----	----	35. 4	24. 0	----	----	----	----	----	----	2	29. 7	103. 1
Abyssinian	938	----	----	----	----	41. 5	----	----	----	----	----	----	----	1	41. 5	111. 9
Palestine	939	----	----	----	----	23. 2	----	----	----	----	----	----	----	1	23. 2	62. 5
Svanhals	187	----	----	----	----	28. 5	14. 5	----	----	----	----	----	----	2	21. 5	74. 7
White Smyrna	910	----	----	----	----	36. 4	18. 7	----	----	----	----	----	----	2	27. 5	95. 5
Steigum	931	----	----	----	----	33. 1	14. 3	40. 1	----	----	----	----	----	3	29. 2	83. 7
Goldfoil	928	----	----	----	----	34. 5	21. 0	36. 3	----	----	----	----	----	3	30. 6	87. 7
Italian	914	----	----	----	----	28. 2	12. 0	----	----	----	----	----	----	2	20. 1	69. 8
Proskowetz	893	----	----	----	----	41. 1	19. 5	50. 9	----	----	----	----	----	3	37. 2	106. 6
Summit	929	----	----	----	----	39. 3	14. 0	----	----	----	----	----	----	2	26. 7	92. 7
Oderbrucker	940	----	----	----	----	36. 4	18. 0	----	----	----	----	----	----	2	27. 2	94. 4
Servian	915	----	----	----	----	26. 5	----	----	----	----	----	----	----	1	26. 5	71. 4
Odessa	916	----	----	----	----	32. 3	23. 3	43. 5	56. 9	48. 0	40. 1	44. 5	----	7	41. 2	108. 7
Do	934	----	----	----	----	35. 4	33. 3	----	----	----	----	----	----	2	34. 3	119. 1
Abyssinian	941	----	----	----	----	48. 5	16. 5	----	----	----	----	----	----	2	32. 5	112. 8
Hanna	942	----	----	----	----	32. 3	17. 0	----	----	----	----	----	----	2	24. 7	85. 8
Coast	2306	----	----	----	----	51. 8	----	----	----	----	----	----	----	1	51. 8	139. 6
Do	2307	----	----	----	----	46. 5	----	----	----	----	----	----	----	1	46. 5	125. 3
Abina	2308	----	----	----	----	49. 7	17. 5	----	----	----	----	----	----	2	33. 6	116. 7
Hanna	2309	----	----	----	----	22. 5	21. 5	----	----	----	----	----	----	2	22. 0	76. 4
Invincible	590	----	----	----	----	29. 8	18. 0	46. 7	----	----	----	----	----	3	31. 5	90. 3
Peru	2311	----	----	----	----	25. 5	25. 5	59. 0	----	----	----	----	----	3	36. 7	105. 2
Heil Hanna 2	678	----	----	----	----	31. 6	19. 2	58. 3	40. 8	44. 9	34. 9	----	----	6	38. 3	104. 1
Franconian	679	----	----	----	----	31. 3	21. 5	37. 9	----	----	----	----	----	3	30. 2	86. 5
Heil Hanna 1	681	----	----	----	----	30. 5	22. 0	----	----	----	----	----	----	2	26. 3	91. 3
Coast	2312	----	----	----	----	42. 9	----	----	----	----	----	----	----	1	42. 9	115. 6
Mahrische	912	----	----	----	----	----	16. 3	38. 1	----	----	----	----	----	2	27. 2	80. 2
Luth	908	----	----	----	----	----	17. 7	63. 6	----	----	----	----	----	2	40. 7	120. 1
Abyssinian	2313	----	----	----	----	----	19. 7	----	----	----	----	----	----	1	19. 7	94. 7
Manchuria	244	----	----	----	----	----	17. 5	----	----	----	----	----	----	1	17. 5	84. 1
Hanna	2316	----	----	----	----	----	18. 3	----	----	----	----	----	----	1	18. 3	88. 0
Abyssinian	2314	----	----	----	----	----	27. 0	46. 7	----	----	----	----	----	2	36. 9	108. 8
Hanna	416	----	----	----	----	----	----	43. 1	----	----	----	----	----	1	43. 1	94. 5
Cortney	976	----	----	----	----	----	----	22. 9	----	----	----	----	----	1	22. 9	50. 2
Hanchamont	1121	----	----	----	----	----	----	41. 2	----	----	----	----	----	1	41. 2	90. 4
Sandrel	937	----	----	----	----	----	----	52. 3	----	----	----	----	----	1	52. 3	114. 7
Abyssinian	950	----	----	----	----	----	----	36. 5	----	----	----	----	----	1	36. 5	80. 0
Australian White	925	----	----	----	----	----	----	43. 2	----	----	----	----	----	1	43. 2	94. 7
Abyssinian	943	----	----	----	----	----	----	51. 8	----	----	----	----	----	1	51. 8	113. 6
Coast	276	----	----	----	----	----	----	53. 9	----	----	----	----	----	1	53. 9	118. 2
Golden Melon	958	----	----	----	----	----	----	36. 7	----	----	----	----	----	1	36. 7	80. 5

TABLE 77.—*Annual acre yields of varieties of barley grown at the United States Plant Introduction Garden, Chico, Calif., in part or all of the 12 years from 1910 to 1921, inclusive*—Continued

Variety	C. I. No.	Acre yields (bushels)												Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Abyssinian	673	----	----	----	----	----	----	43.7	----	----	----	----	----	1	43.7	95.8
Holland	952	----	----	----	----	----	----	52.0	----	----	----	----	----	1	52.0	114.0
Nerchinsk	216	----	----	----	----	----	----	34.5	----	----	----	----	----	1	34.5	75.7
Alpha	959	----	----	----	----	----	----	37.0	----	----	----	----	----	1	37.0	81.4
Frankish	953	----	----	----	----	----	----	35.4	----	----	----	----	----	1	35.4	77.6
Featherston	954	----	----	----	----	----	----	17.3	----	----	----	----	----	1	17.3	37.9
Trebi	936	----	----	----	----	----	----	62.5	----	----	51.3	58.8	30.8	4	50.9	123.2
Abyssinian	946	----	----	----	----	----	----	----	17.6	25.4	25.3	----	----	3	22.8	55.1
Do	1236	----	----	----	----	----	----	----	20.4	----	----	----	----	1	20.4	49.4
Blarney	1303	----	----	----	----	----	----	----	----	----	19.8	21.4	----	2	20.6	48.6
Hurst	1304	----	----	----	----	----	----	----	----	----	31.3	31.3	----	2	31.3	73.8
Louden	1308	----	----	----	----	----	----	----	----	----	23.9	32.3	----	2	28.1	66.3
Himalaya	1312	----	----	----	----	----	----	----	----	----	22.8	61.3	----	2	42.1	99.3
Meloy	1176	----	----	----	----	----	----	----	----	----	----	45.0	5.5	2	25.3	65.9
California Mariout	1455	----	----	----	----	----	----	----	----	----	----	----	25.8	1	25.8	96.6
Arequipa	1256	----	----	----	----	----	----	----	----	----	----	----	41.7	1	41.7	156.2
Kopeck	869	----	----	----	----	----	----	----	----	----	----	----	29.7	1	29.7	111.2
Hero	1286	----	----	----	----	----	----	----	----	----	----	----	23.7	1	23.7	88.8
Sagina	1269	----	----	----	----	----	----	----	----	----	----	----	15.7	1	15.7	58.8

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 13 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years. Under "Data shown" P=Percentage yield and Y=Years comparable]

Variety	C. I. No.	Data shown	Varieties and percentages												
			Chevalier	Invincible	Heil Hanna 2	Hannchen	Oderbrucker	Odessa	Coast	Poda	Club Mariout	White Smyrna	Beldi Dwarf	Abyssinia	Tennessee Winter
Chevalier	278	Y	-----	1	4	6	(*)	4	7	7	7	7	7	6	4
		P	-----	123.6	99.8	101.0	-----	94.7	80.5	81.3	88.7	85.5	88.4	107.8	87.4
Invincible	590	Y	1	-----	3	2	2	3	3	3	1	3	3	3	(*)
		P	80.9	-----	86.6	105.4	87.9	95.4	69.0	75.6	96.9	78.3	77.0	69.4	-----
Heil Hanna 2	678	Y	4	3	-----	5	2	6	6	6	4	6	6	6	3
		P	100.2	115.4	-----	119.6	93.4	94.1	78.9	76.5	81.6	86.9	81.7	106.6	93.1
Hannchen	531	Y	6	2	5	-----	1	6	8	8	7	8	8	7	4
		P	99.0	94.9	83.6	-----	153.9	85.9	84.9	82.1	83.5	92.0	89.6	107.2	89.0
Oderbrucker	940	Y	(*)	2	2	1	-----	2	2	2	(*)	2	2	2	(*)
		P	-----	113.8	107.1	65.0	-----	97.8	75.3	90.1	-----	83.7	73.9	61.3	-----
Odessa	916	Y	4	3	6	6	2	-----	7	7	5	7	7	6	4
		P	105.5	104.9	106.3	116.4	102.2	-----	81.6	81.8	82.5	92.0	83.2	113.3	106.2
Coast	626	Y	7	3	6	8	2	7	-----	11	10	12	12	8	6
		P	124.3	145.0	126.7	117.8	132.7	122.5	-----	105.3	108.9	108.7	106.9	117.2	120.1
Poda	652	Y	7	3	6	8	2	7	11	-----	9	11	11	8	6
		P	123.0	132.3	130.6	121.7	111.0	122.2	95.0	-----	105.5	105.9	101.8	119.2	114.9
Club Mariout	261	Y	7	1	4	7	(*)	5	10	9	-----	10	10	6	6
		P	112.7	103.2	122.5	119.8	-----	121.2	91.8	94.8	-----	99.5	99.4	128.7	112.1
White Smyrna	195	Y	7	3	6	8	2	7	12	11	10	-----	12	8	6
		P	116.9	127.7	115.1	108.7	119.5	108.7	92.0	94.4	100.5	-----	98.4	110.3	103.1
Beldi Dwarf	190	Y	7	3	6	8	2	7	12	11	10	12	-----	8	6
		P	113.1	129.9	122.3	111.6	135.3	120.1	93.6	98.2	100.6	101.7	-----	109.5	117.4
Abyssinia	361	Y	6	3	6	7	2	6	8	8	6	8	8	-----	3
		P	92.7	144.0	93.8	93.3	163.1	88.2	85.3	83.9	77.7	90.6	91.3	-----	61.2
Tennessee Winter	257	Y	4	(*)	3	4	(*)	4	6	6	6	6	6	3	-----
		P	114.4	-----	107.5	112.4	-----	94.1	83.2	87.0	89.2	97.0	85.2	163.4	-----

Of the varieties given a detailed comparison of 13 is shown in Table 77. The 2 North African barleys, Coast (C. I. No. 626) and Poda (C. I. No. 652), were the best of the 13. Poda is of the Peruvian type. The North African barleys as now grown in California contain two quite different types, although both are obviously North African in origin and character. The predominating type is a nodding barley with kernels which, though they are long, are shorter than those of most North African varieties. Barleys of the Poda, or Peruvian, type have more erect spikes and longer kernels. They are also more likely to have blue color in the endosperm.

Beldi Dwarf (C. I. No. 190), which is similar to the California Mariout (C. I. No. 1455), was third in point of yield at Chico. White Smyrna (C. I. No. 195), ranking fourth, gave relatively higher yields at Chico than at Davis. Club Mariout (C. I. No. 261) was fifth. This barley came from the same region in Egypt from which the California Mariout was imported. The former has given very good yields at Chico, and the quality of the grain when well grown is not surpassed by that of any barley in America. These varieties are discussed in detail in the section of this bulletin devoted to descriptions of the better varieties.

In the summarized digest of Table 77 a comparison of one of the Abyssinian barleys with 12 other varieties is shown. While it was superior only to Oderbrucker (C. I. No. 940) and Invincible (C. I. No. 590) its yield was more than 90 per cent of that of five other varieties. Few Abyssinian barleys have been imported into the United States. The varieties from Abyssinia grow well in California, and from their appearance it is probable that they would have value in hybridizing.

Tennessee Winter (C. I. No. 257) has been grown at Chico but has not proved equal to the barleys of North Africa and Asia Minor. It has been a very good variety, however. Chico unquestionably is in the district well suited to the production of barleys of the North African type. It is also possible that barleys from Asia Minor may be found which would be very high yielding.

MODESTO, CALIF.

The barleys grown at Modesto, Calif., from 1906 to 1909, inclusive, were tested in cooperation with the California Agricultural Experiment Station. The conditions under which these tests were made were not altogether favorable, and no definite conclusions can be drawn.

It is quite evident from Table 78 that White Smyrna (C. I. No. 195) and Coast (C. I. No. 626) were the best yielding sorts. In 1907 Coast gave the better yield, in 1908 White Smyrna exceeded all varieties grown, and in 1909 White Smyrna and Coast were almost equal. Club Mariout (C. I. No. 261) produced the highest yield of the spring varieties in 1909. In that year Tennessee Winter (C. I. No. 257) gave the unusually high yield of 67.6 bushels. The spring barleys were seeded later than the optimum date in the tests made.

TABLE 78.—*Annual acre yields of varieties of barley grown at Modesto, Calif., in two or more of the four years from 1906 to 1909, inclusive*

[Data obtained in cooperation with the California Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)				Years grown	Average yield (bus.)	Percentage of weighted mean
		1906	1907	1908	1909			
Beldi Dwarf	190	5.7	--------	39.7	--------	2	22.7	102.3
Black Smyrna	191	9.8	--------	12.4	--------	2	11.0	50.0
White Smyrna	195	10.9	8.6	65.0	13.6	4	24.5	111.4
Telli	194	8.8	--------	12.2	13.6	3	11.5	49.1
Tennessee Winter	257	9.4	--------	--------	67.6	2	38.5	230.5
Club Mariout	261	8.4	--------	28.8	23.4	3	20.2	86.3
Coast	626	--------	12.2	55.0	13.0	3	26.7	95.0

DAVIS, CALIF.

Davis, Calif., is situated in the Sacramento Valley in a section of heavy barley production. The Sacramento and San Joaquin Valleys are the most important centers of production of barleys of the Coast type in the United States. Barley was brought into California with the early missions. Its production extended rapidly in the Sacramento and San Joaquin Valleys after the discovery of gold in 1848.

The University Farm at Davis has been an important station in the testing and production of varieties and is very favorably situated for the continuation of experiments in barley. Yields from 1908 to 1920 have been furnished by the California Agricultural Experiment Station. These are reported in Table 79. Three or four varieties which could not be definitely identified were not included in this table. Ten varieties are compared in detail in the summarized digest of Table 79. Of these, the two highest yielding were Coast (C. I. Nos. 2821 and 626). Coast (C. I. No. 2821) is a selection developed by the California Agricultural Experiment Station and distributed as California No. 4000. The name "Coast" is given here not with the intention of changing the varietal name as far as its use in California is concerned, but simply to identify its type more definitely in this bulletin. Coast (C. I. No. 626) is the ordinary commercial barley of California. California Mariout (C. I. No. 1455), which was third in point of yield, is a variety which has been distributed by the California station. The history of this and of California No. 4000 as well as the adaptation of these varieties is considered elsewhere in this bulletin. Of the 10 varieties compared, Beldi Giant (C. I. No. 2777) was fourth. All four of these varieties originated in North Africa.

Fifth in point of yield was White Smyrna (C. I. No. 195). This variety originated in Asia Minor under conditions somewhat similar to those found in North Africa. Hannchen was the highest yielding sort of any of those which do not trace back to either North Africa or Asia Minor. Hannchen (C. I. No. 531) produces very good results in California, but is obviously not so well adapted as the barleys of the North African group. Perhaps the most interesting variety from the standpoint of yield is Oderbrucker (C. I. No. 537). This barley was not grown many years, as it was obviously inferior. Although it is extremely well adapted to the northern Mississippi Valley, it is almost worthless in California. It was superior to none of the nine varieties with which it was compared, being inferior even to Nepal (C. I. No. 595), which is usually the poorest type grown. There is no question as to types of barleys best suited to the district around Davis. Barleys of North African origin are outstanding in their yielding capacity.

Recently two barleys have been distributed in California which have quickly attained a commercial status. These are Club Mariout (C. I. No. 261) and California Mariout (C. I. No. 1455). Both came originally from Egypt. The acreage of the former is increasing rapidly in the Sacramento and upper San Joaquin Valleys, where it is meeting with a ready market in the export trade. California Mariout has been found to be superior under low rainfall conditions in the San Joaquin Valley, although its acreage is not limited to this locality.

TABLE 79.—*Annual acre yields of varieties of barley grown at University Farm, Davis, Calif., in one or more of the 13 years from 1908 to 1920, inclusive*

[Data obtained through the courtesy of the California Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)													Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920			
Kitzing	201	26.9	42.0	66.0	87.6										4	55.6	126.7
Hanna	203	14.5	55.4	59.5											3	43.1	123.5
Chevalier	267	19.9													1	19.9	102.1
Webs	268	18.0													1	18.0	92.3
Frankish	269	17.6						34.8	40.6	53.2					4	36.5	94.8
Gold Medal	271	12.6													1	12.6	64.6
Fünfstettener	279	24.0													1	24.0	123.1
Frankish	282	13.5													1	13.5	69.2
Bohemian	284	15.9		65.2	91.0			58.4	47.5	21.6					6	49.9	105.5
Hanna	287	15.0													1	15.0	76.9
Goldthorpe	409	14.9	46.3												2	30.6	107.4
Frankish	295	16.8													1	16.8	86.2
Prague	317	21.1													1	21.1	108.2
Princess	529	28.8	28.7	57.1											3	38.2	109.5
Chevalier II	200	21.2	39.2	65.8											3	42.1	120.6
Hannchen	531	32.4	45.0	73.0	88.8	83.8	91.1	63.0	45.0	37.0	103.7	50.5			11	64.8	117.2
White Smyrna	195	14.7	48.0	62.9	114.0	99.2	69.8	64.4	60.2	85.6	104.0	48.5			11	70.1	126.8
Oderbrucker	537	13.4	42.1	29.6	48.8										4	33.5	76.3
Svanhals	187	26.4	42.5	68.7	87.2	74.3	79.1	60.4	53.8	51.6	93.7	43.5			11	61.9	111.9
Coast	626	29.8	66.3		120.0	90.1	101.1	56.4	56.6	66.0	104.0	94.0	38.0	80.7	12	75.3	136.2
Beldi Dwarf	190	25.7	59.4												2	42.5	149.1
Telli	194	13.9	33.3	55.4											3	34.2	98.0
Bohemian	204	15.3	46.7	56.1											3	39.4	112.9
Do	270	21.7													1	21.7	111.3
Kitzing	272	26.0													1	26.0	133.3
Laniger	274	15.0													1	15.0	76.9
Kwassitzer	275	25.2	53.2	55.0											3	44.5	127.5
Bohemian	285	11.7													1	11.7	60.0
Do	293	13.8													1	13.8	70.8
Hanna	301	19.1													1	19.1	97.9
Laniger	302	17.7													1	17.7	90.8
Bohemian	344	10.5													1	10.5	53.8
Schwarzenberg I	346	27.7													1	27.7	142.1
Schwarzenberg III	348	18.6													1	18.6	95.4
Kitzing	189	26.9	51.8	62.0											3	46.9	134.4
Chevalier	290	16.8	64.2	59.4	87.2			60.6	53.7	40.8	100.3	39.8			9	58.1	112.4
Mensury	2657	17.9	34.6	36.0	68.8			54.4	50.4	80.9	96.2	49.0			9	54.2	104.8
Tennessee Winter	257		51.7												1	51.7	112.4

Nepal	595	--------	23.7	45.6	70.9	--------	--------	36.4	38.0	39.6	53.7	--------	--------	--------	7	44.0	70.5
California Mariout	1455	--------	--------	--------	126.6	92.4	106.2	50.4	54.6	68.0	103.0	55.2	--------	--------	8	82.1	117.6
Famesh	616	--------	--------	--------	51.6	--------	--------	15.6	23.0	36.4	--------	--------	--------	--------	4	31.7	51.9
Benghazi	661	--------	--------	--------	116.4	101.8	96.8	58.0	49.8	42.1	104.3	46.5	--------	--------	8	77.0	110.3
Beldi Giant	2777	--------	--------	--------	101.6	83.6	104.8	63.2	51.9	75.6	120.2	55.5	--------	86.3	9	82.5	117.9
Coast	2821	--------	--------	--------	--------	--------	119.6	76.8	52.7	93.2	128.3	45.0	--------	--------	6	85.9	133.2
Kashgar Hull-less	528	--------	--------	--------	--------	--------	--------	16.4	--------	--------	--------	--------	--------	--------	1	16.4	32.1
Hodge	982	--------	--------	--------	--------	--------	--------	55.6	46.9	86.2	107.7	55.5	--------	--------	5	70.4	115.4
Portuguese	2641	--------	--------	--------	--------	--------	--------	43.6	51.4	67.8	--------	--------	--------	--------	3	54.3	102.6

Summarized Digest, Showing the Relative Performance of 10 Representative Varieties

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages									
			Chevalier	Svanhals	Hannchen	Oderbrucker	California Mariout	Coast	Coast	Beldi Giant	White Smyrna	Nepal
Chevalier	290	Years comparable	--------	9	9	4	6	8	5	6	9	7
		Percentage yield	--------	99.1	97.1	170.0	83.5	78.1	74.5	81.7	86.8	151.4
Svanhals	187	Years comparable	9	--------	11	4	8	10	6	8	11	7
		Percentage yield	101.0	--------	95.5	167.9	82.8	78.1	74.1	82.8	88.3	148.7
Hannchen	531	Years comparable	9	11	--------	4	8	10	6	8	11	7
		Percentage yield	103.0	104.7	--------	178.6	85.8	81.6	75.7	85.8	92.5	147.9
Oderbrucker	537	Years comparable	4	4	4	--------	1	3	(*)	1	4	3
		Percentage yield	58.8	59.6	56.0	--------	38.5	48.3	--------	48.0	55.9	85.9
California Mariout	1455	Years comparable	6	8	8	1	--------	8	6	8	8	5
		Percentage yield	119.7	120.8	116.6	259.4	--------	95.4	84.8	100.0	101.7	168.7
Coast	626	Years comparable	8	10	10	3	8	--------	6	9	10	6
		Percentage yield	128.0	128.0	122.5	207.2	104.8	--------	92.7	103.5	110.7	178.9
Do.	2821	Years comparable	5	6	6	(*)	6	6	--------	6	6	4
		Percentage yield	134.1	134.9	132.1	--------	117.9	107.8	--------	109.4	119.2	209.3
Beldi Giant	2777	Years comparable	6	8	8	1	8	9	6	--------	8	5
		Percentage yield	122.4	120.8	116.6	208.2	100.0	96.6	91.4	--------	101.7	172.9
White Smyrna	195	Years comparable	9	11	11	4	8	10	6	8	--------	7
		Percentage yield	115.2	113.2	108.1	178.9	98.4	90.3	83.9	98.4	--------	175.1
Nepal	595	Years comparable	7	7	7	3	5	6	4	5	7	--------
		Percentage yield	66.0	67.2	67.6	116.3	59.3	55.9	47.8	57.8	57.1	--------

DATA FROM SOUTHERN STATIONS IN THE UNITED STATES

Two ecological regions have already been described. The first of these is the region with the growing and ripening seasons both humid. This extends from eastern Canada and the northern seaboard of the United States across the Northern States to the Great Plains and through the prairie Provinces of Canada. The second comprises the region where the rainfall is much less and the ripening season comes during a part of the year when the humidity is low. This region extends from the northern Great Plains west and south, including all the Mountain and Western States. The remaining district, a relatively unimportant one in barley production, includes the Southeastern States and extends westward, including Texas and Oklahoma. The summers here are too hot and humid for the growing of spring barley. The barley is fall sown. The varieties used are those more than usually winter hardy and adapted to humid conditions. As heretofore stated, the stations are arranged in order from east to west.

COLLEGE PARK, MD.

Barley varieties were grown at the Maryland Agricultural Experiment Station (at College Park) in the years 1908 to 1916, inclusive. The yields of the varieties shown in Table 80 were obtained in cooperation with the Maryland station. All of the 15 barleys grown were true winter sorts and were sown in the fall. Only four of these were grown for a longer period than three years. Maryland Winter (C. I. No. 518) was obviously the best of the four. Mammoth Winter (C. I. No. 410) and Tennessee Winter (C. I. No. 257) produced nearly the same average yields for the comparable years, 1908 to 1914, inclusive. Winter Six-Rowed (C. I. No. 328) was surpassed by the three mentioned above. All four varieties are quite similar and belong to the Tennessee Winter group.

Arlington Awnless (C. I. No. 702), which was grown from 1913 to 1915, inclusive, was much inferior in yield to the varieties of the Tennessee Winter group. While Arlington Awnless is a very desirable type of barley, it shatters quite easily, thus causing the loss of much grain. The only 2-rowed barley grown in this experiment was Nesbian (C. I. No. 647), which was tested in 1915. It produced a very low yield, as did Osaka (C. I. No. 2798) and Virginia Hooded (C. I. No. 648), which were also grown in that year. The results at College Park indicate that the barleys of the Tennessee Winter type are the ones best adapted to the growing conditions of this section of Maryland.

TABLE 80.—*Annual acre yields of varieties of barley grown at the Maryland Agricultural Experiment Station (at College Park) in part or all of the nine years from 1908 to 1916, inclusive*

[Data obtained in cooperation with the Maryland Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)									Years grown	Average yield (bus.)	Percentage of weighted mean
		1908	1909	1910	1911	1912	1913	1914	1915	1916			
Maryland Winter	518	32.9	36.7	24.7	31.9	42.0	32.1	37.5	22.7	48.2	9	34.3	121.6
Mammoth Winter	410	23.5	34.7	20.1	33.0	47.4	35.2	39.6			7	33.4	110.2
Tennessee Winter	257	39.8	29.8	20.7	32.8	42.6	31.8	35.8	15.7		8	31.1	111.9
Winter Six-Rowed	328	24.7	27.6	22.8	36.4	33.9	24.9	35.4			7	29.4	97.0
Arlington Awnless	702						16.4	17.6	15.9		3	16.6	71.2
Squarehead Winter	252	29.7	35.2								2	32.5	111.7
Tenarab	662	24.1	30.4								2	27.3	93.8
Dutrow Winter	2797		32.8	22.6							2	27.7	98.2
Han River	206	28.5									1	28.5	106.3
Black Winter	337	25.4									1	25.4	94.8
Albacete	199	21.6									1	21.6	80.6
Greece	221	17.8									1	17.8	66.4
Nesbian	647								6.9		1	6.9	61.6
Osaka	2798								3.5		1	3.5	31.3
Virginia Hooded	648								2.3		1	2.3	20.5

ROSSLYN, VA.

At Arlington Experiment Farm 72 varieties and strains of barley have been tested in periods of varying length during the years 1909 to 1921, inclusive. This farm, which is at Rosslyn, Va., across the Potomac River from Washington, D. C., is owned and operated by the United States Department of Agriculture. Table 81 shows the yields of the 72 varieties, all of which were sown in the fall. The 11 prominent winter and spring sorts are compared in the summarized digest of the table. Orel (C. I. No. 351), a 2-rowed variety, perhaps is one of the best of those compared. Although it was surpassed in yield by both Chevalier (C. I. No. 156) and Hanna (C. I. No. 287) in 1911and 1912, the years in which they were comparable, neither of these varieties produced high yields. Orel entirely winterkilled in 1912, making its average yield for the two years very low. Han River (C. I. No. 2163), a 6-rowed variety, also produced very high yields. It was not grown the same years as Chevalier and Hanna, so no comparison can be made with these varieties.

Wisconsin Winter (C. I. No. 2159), which was equal to Orel and Han River in point of yield, seems quite winter hardy at Arlington. It makes a fall growth heavier than that of the Tennessee Winter, so that the chances of winterkilling would be greater at most stations. In recent years Han River has been surpassed by both Wisconsin Winter and Tennessee Winter. Following Wisconsin Winter is Scottish Pearl (C. I. No. 277), a barley of the Tennessee Winter group, and Pidor (C. I. No. 901), a hybrid resulting from the cross Tennessee Winter × Hankow. Although Tennessee Winter (C. I. No. 257) was surpassed by the varieties mentioned above for the years in which it was comparable, it averaged 30.3 bushels for the 13 years of the experiments, as compared with 31.2 bushels for Wisconsin Winter (C. I. No. 2159) for this same period.

The three spring varieties compared in Table 81—Chevalier (C. I. No. 156), Hanna (C. I. No. 287), and Svanhals (C. I. No. 187)—all produced very low yields. Neither the spring nor the hull-less varieties have given satisfactory results at Arlington. When the spring varieties are sown in the fall their growth is so rapid that unless the winter months are very mild they will not survive. When sown in the spring they do not reach full development because of the early advent of high temperatures.

Orel produced unusually high yields during the four years from 1918 to 1921, inclusive (Table 81). Texas Winter (C. I. No. 554), a locally adapted variety of the Tennessee Winter group, produced an average yield of 118 per cent of the weighted mean for the nine years it was tested. Two hybrids of a Tennessee Winter cross, Cusado (C. I. No. 895) and Tenkow (C. I. No. 646), also produced fair yields.

From the results at Arlington Experiment Farm it is evident that several types, such as Orel, Wisconsin Winter, and varieties of the Tennessee Winter group, are successful here.

Wisconsin Winter and Orel appear to be better varieties than Tennessee Winter. The value of Tennessee Winter may not be fully indicated by the yields at Arlington farm, which is protected by the hills and is doubtless warmer than most of the grain-growing sections of Maryland and Virginia. Tennessee Winter is more winter hardy than the varieties which gave higher yields at Arlington. In the Piedmont area it probably would be more dependable.

Orel obviously has unusual qualities. It yields well. It is winter hardy and at least at Arlington it is less affected by smut than Tennessee Winter. As it succeeds as a spring variety at Akron, Colo., its winter dormancy is likely to be less than that of Tennessee Winter. In the warmer sections of the South this lack of dormancy may prove to be an asset. The experimental results with barley in the South are too meager as yet to form the basis of an intelligent opinion, but there are indications that on the Coastal Plains the highest yields will be obtained from varieties which take advantage of the first growing weather of the spring. In the latitude of Washington, D. C., Tennessee Winter does this, but farther south on the Coastal Plains its dormancy may be a handicap.

Another desirable quality in winter barleys either in the South or in the latitude of Washington, D. C., is the habit of early growth in the spring, which is of great advantage in checking the development of weeds. Wisconsin Winter is one of the better varieties in this respect.

TABLE 81.—*Annual acre yields of varieties of barley grown at the Arlington Experiment Farm, Rosslyn, Va., in part or all of the 13 years from 1909 to 1921, inclusive*

Variety	C. I. No.	Acre yields (bushels)													Years grown	Average yield (bus.)	Percentage of weighted mean
		1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921			
Tennessee Winter	257	41.7	23.4	15.0	35.3	21.7	30.7	35.1	40.1	41.9	33.6	31.1	21.3	22.9	13	30.3	122.2
Wisconsin Winter	2159	45.0	14.3	15.4	25.5	31.4	33.5	33.8	42.9	39.6	42.5	39.8	14.6	27.4	13	31.2	125.8
Maryland Winter	518	39.7	27.3			21.5	24.2								4	28.2	112.8
Texas Winter	554		28.6	22.8	26.2	22.5	22.8				47.1	24.8	13.7	25.4	9	26.0	118.2
Virginia Hooded	648		45.8	13.4	0	28.4	19.4	0							6	17.8	82.4
Large-Grained Winter	408		21.3			30.4	31.3								3	27.7	113.5
Odessa	182		17.5			28.5									2	23.0	100.4
Telli	194		22.5			31.5		13.7							3	22.6	94.6
Gatami	575		16.5	15.2	0										3	10.6	58.6
Albacete	199		15.4	12.3		24.2									3	17.3	82.0
Bestehorn Giant	414		19.6		51.4	10.0									3	27.0	134.3
Manchuria	613		25.2	16.0											2	20.6	104.0
Greece	221		34.1					39.0	49.4	34.4	32.1	20.0	10.9	23.2	8	31.5	113.7
Svanhals	187		20.8	8.3	15.7	25.3	25.8	5.3	30.5	29.6	20.7	25.0	7.0	6.2	12	18.3	74.4
Hanna	287		26.7	14.8	11.8	18.8									4	18.0	91.8
Chevalier	156		14.6	36.9	7.2	14.6									4	18.3	93.4
Princess	529		19.0	17.7	0										3	12.2	67.4
Chevalier	612		15.0	19.2											2	17.1	86.4
Turkestan	712			3.3	2.8	4.2									3	3.4	17.9
Arabel	896			17.3	38.0	28.1	26.3								4	27.4	132.4
Cusado	895			18.9	30.5	28.8	29.2	27.2	44.8	39.2	32.5	25.8	13.7	21.2	11	28.3	114.1
Canada Winter	713			16.0	29.3	25.0	28.5								4	24.7	119.3
Tenkow	646			13.3		39.6	32.1	21.8	46.7	50.5	36.7	29.4		17.9	9	32.0	118.5
Nesbian	647			15.9	12.3	24.0	24.8								4	19.3	93.2
Black Arabian	202			11.7	37.9	18.5									3	22.7	119.5
Hanna	203			6.3	6.2	18.1									3	10.2	53.7
Hannchen	531			40.8	0										2	20.4	120.7
Bavarian	160			30.0	0										2	15.0	88.8
Do	159			41.0	0										2	20.5	121.3
Chevalier II	200			5.4	0										2	2.7	16.0
Prize Prolific	169			9.2	0										2	4.6	27.2
Black Smyrna	191			13.1		28.3									2	20.7	100.0
Orel	351			13.4	0						50.8	48.8	14.1	36.9	6	27.3	131.9
Hansee Hull-less	703			30.0	25.7	14.1	34.1	21.1	27.4	36.4	9.4	25.0	6.0	19.4	11	22.6	91.1
Sangatsuka	78			26.6	9.8	23.7									3	20.0	105.3
Hankow	197			25.6	9.5										2	17.5	103.6
Black Hull-less	596			17.1	0										2	8.5	50.3
Kamamugi	577			21.2											1	21.2	116.5
Wakamatsu	579			17.1											1	17.1	94.0
Squarehead Winter	252				24.2	30.8	27.7				37.5	29.8	15.8	16.7	7	26.1	115.0

Argentine	223				18.2	16.7	33.3	20.4	32.5						5	24.2	98.0
Arlington Awnless	702				20.5	17.5	22.3	20.4	17.8						5	16.7	79.8
Caveda	455				23.6	9.2									2	16.4	84.5
Han River	206				2.9										1	2.9	18.5
White Smyrna	195				36.7	8.8									2	22.7	117.0
Terwin	539				31.9	22.0									2	26.9	138.7
Alaska	534					27.5									1	27.5	119.0
Blue Ribbon	611					26.0									1	26.0	112.6
Osaka	2798					27.9	25.8								2	26.9	108.0
Omar	898					25.0	25.6	44.5	37.1	33.7	35.9	24.2			7	32.3	109.5
Scottish Pearl	277					36.0	32.3	22.4	33.6	46.3	30.0	31.5	24.4	28.9	9	31.7	116.1
Mammoth Winter	220						23.5								1	23.5	86.4
Union Winter	583						27.1	44.5	43.4						3	38.3	129.0
Pidor	901						32.5	21.9	37.4	48.5	44.4	30.7	19.3	25.1	8	32.3	115.2
Valkow	902						24.8								1	24.8	91.2
Arlington Awnless	2160						25.0								1	25.0	91.9
Do	2161						25.2	15.9							2	20.5	76.8
Do	2162						20.4								1	20.4	75.0
Han River	2163							45.5	44.9	52.8	37.1	22.9	22.8	23.7	7	35.7	126.1
Pontius	731							9.8	32.8	32.6	22.7				4	24.5	76.1
Nakano Wase	754							39.6	31.7	36.3	0	46.2	4.7	25.4	7	26.3	92.9
Niver	737							21.5	29.0						2	25.3	81.6
Black Russian	705							46.2	34.4	31.3	25.4				4	34.3	106.5
Fleche	1263							7.0	24.5						2	15.7	50.6
Khayyam	1117							41.7	33.2	36.5	20.9	24.2	8.2	9.2	7	24.8	87.6
Servian	915								38.0						1	38.0	106.7
Nakano Wase	2164								32.0	39.7	0	40.0	4.4	21.5	6	22.9	79.5
Do	2165								36.7	44.6					2	40.7	108.8
Do	2166								37.5	45.3	0	36.7	12.3	16.4	6	24.7	85.8
Szechwan	664								32.0						1	32.0	89.9
Cartouch	1107										36.7	24.4	10.4	10.7	4	20.5	85.4
Wisconsin Winter	2167											38.6	24.5	24.1	3	29.1	129.9

TABLE 81.—*Annual acre yields of varieties of barley grown at the Arlington Experiment Farm, Rosslyn, Va., in part or all of the 13 years from 1909 to 1921, inclusive*—Continued

SUMMARIZED DIGEST, SHOWING THE RELATIVE PERFORMANCE OF 11 REPRESENTATIVE VARIETIES

[*Explanation.*—The asterisk (*) indicates that the two varieties to which it relates were not grown in the same years]

Variety	C. I. No.	Data shown	Varieties and percentages										
			Chevalier	Hanna	Svanhals	Tennessee Winter	Han River	Scottish Pearl	Wisconsin Winter	Hansee Hull-less	Nakano Wase	Orel	Pidor
Chevalier	156	Years comparable		4	4	4	(*)	1	4	3	(*)	2	(*)
		Percentage yield		101.7	104.6	76.8		40.6	84.6	84.1		329.1	
Hanna	287	Years comparable	4		4	4	(*)	1	4	3	(*)	2	(*)
		Percentage yield	98.4		102.9	75.6		52.2	83.3	65.1		198.5	
Svanhals	187	Years comparable	4	4		12	7	9	12	11	6	6	8
		Percentage yield	95.6	97.2		62.5	49.8	61.5	61.0	80.2	80.3	50.5	57.8
Tennessee Winter	257	Years comparable	4	4	12		7	9	13	11	6	6	8
		Percentage yield	130.2	132.3	159.9		90.5	97.5	97.1	132.2	128.8	97.1	98.8
Han River	2163	Years comparable	(*)	(*)	7	7		7	7	7	6	4	7
		Percentage yield			200.9	110.5		115.0	103.7	172.6	137.8	70.7	109.9
Scottish Pearl	277	Years comparable	1	1	9	9	7		9	9	6	4	8
		Percentage yield	246.6	191.5	162.7	102.5	87.0		93.4	148.0	131.4	76.2	96.0
Wisconsin Winter	2159	Years comparable	4	4	12	13	7	9		11	6	6	8
		Percentage yield	118.1	120.1	163.8	103.0	96.4	107.0		139.4	139.6	100.7	105.5
Hansee Hull-less	703	Years comparable	3	3	11	11	7	9	11		6	6	8
		Percentage yield	118.9	153.7	124.7	75.6	57.9	67.6	71.7		83.4	70.4	68.8
Nakano Wase	2166	Years comparable	(*)	(*)	6	6	6	6	6	6		4	6
		Percentage yield			124.5	77.6	72.6	76.1	71.6	119.9		43.4	72.1
Orel	351	Years comparable	2	2	6	6	4	4	6	6	4		4
		Percentage yield	30.4	50.4	197.8	103.0	141.4	131.2	99.3	142.0	230.3		126.0
Pidor	901	Years comparable	(*)	(*)	8	8	7	8	8	8	6	4	
		Percentage yield			173.1	101.2	91.0	104.1	94.7	145.3	138.6	79.3	

BLACKSBURG, VA.

The yields of barley varieties grown at Blacksburg, Va. (Table 82), were obtained through the courtesy of the Virginia Agricultural Experiment Station. During the years from 1914 to 1921, inclusive, 20 winter barleys were tested, and 17 spring varieties from 1917 to 1919, inclusive. In 1919 the spring varieties were destroyed by extremely wet weather.

All of the winter varieties grown in 1914 were selections made at the Virginia station. Five of these were grown during the entire eight years of the experiments, all of them producing comparatively high average yields with the exception of C. I. No. 3153. Because of crop failure no yields were recorded for the years 1917 and 1921. In 1918 eight winter barleys were introduced and continued through 1921. Union Winter (C. I. No. 583), a barley of the Tennessee Winter group, produced the highest average yield of all varieties for these four years. C. I. No. 3153 was second in point of yield for this period. Its average for the eight years tested was quite low. Following C. I. No. 3153 are two other selections, C. I. Nos. 3164 and 3163. Both of these are selections from C. I. No. 3154, the first being 6-rowed and the second 2-rowed. It is to be regretted that there is no record of the source of the stock from which the early selections were made. Both Arlington Awnless (C. I. No. 702) and Tennessee Winter (C. I. No. 257) produced comparatively high yields during this 4-year period. Arlington Awnless is not usually a high-yielding sort and it shatters very badly.

TABLE 82.—*Annual acre yields of varieties of barley grown at the Virginia Agricultural Experiment Station (at Blacksburg) in part or all of the eight years from 1914 to 1921, inclusive*

[Data obtained through the courtesy of the Virginia Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)								Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915	1916	1917	1918	1919	1920	1921			
Winter barley:												
Virginia Selection	3148	12.5	25.4	0	------	------	------	------	------	3	12.6	66.0
Do	3149	20.3	44.0	26.6	0	10.3	17.5	34.4	0	8	19.1	134.5
Do	3150	9.9	57.0	18.1	0	11.2	20.3	32.7	0	8	18.7	131.7
Do	3151	6.8	39.4	30.2	0	9.6	17.5	25.8	0	8	16.2	114.1
Do	3152	13.5	28.1	0	------	------	------	------	------	3	13.9	72.8
Do	3153	3.6	7.2	10.8	0	13.4	21.7	36.1	0	8	11.6	81.7
Do	3154	9.4	40.5	32.7	0	------	------	------	------	4	20.7	120.3
Do	3155	8.9	21.6	9.6	0	------	------	------	------	4	10.0	58.1
Do	3156	12.5	31.6	0	------	------	------	------	------	3	14.7	77.0
Do	3157	6.8	44.0	45.9	0	10.3	16.5	30.9	0	8	19.3	135.9
Hull-less	3158	5.2	26.6	0	------	------	------	------	------	3	10.6	55.5
Virginia Selection	3159	1.3	17.8	------	------	------	------	------	------	2	9.5	46.1
Arlington Awnless	702	------	------	------	------	9.7	22.3	29.2	0	4	15.3	127.5
Winter	3160	------	------	------	------	7.2	20.3	27.5	0	4	13.7	114.2
Tennessee Winter	257	------	------	------	------	11.3	19.9	27.5	0	4	14.7	122.5
Union Winter	583	------	------	------	------	13.2	21.7	37.8	0	4	18.2	151.7
Winter Beardless	3161	------	------	------	------	16.2	11.0	15.5	0	4	10.7	89.2
Tennessee	3162	------	------	------	------	6.9	17.9	8.6	0	4	8.3	69.2
Virginia Selection	3163	------	------	------	------	14.9	25.1	24.1	0	4	16.0	133.3
Do	3164	------	------	------	------	17.2	26.5	20.6	0	4	16.1	134.2
Spring barley:												
Manchuria	3166	------	------	------	19.2	15.5	0	------	------	3	11.6	94.3
Gatami	575	------	------	------	20.3	14.5	0	------	------	3	11.6	94.3
Eagle	913	------	------	------	20.3	16.3	0	------	------	3	12.2	99.2
Black Hull-less	596	------	------	------	15.3	------	------	------	------	1	15.3	105.5
Featherston	911	------	------	------	26.5	22.2	0	------	------	3	16.2	131.7
Chevalier	3165	------	------	------	20.6	11.0	0	------	------	3	10.5	85.4
Black Egyptian	1246	------	------	------	17.2	10.7	0	------	------	3	9.3	75.6
Luth	908	------	------	------	22.9	17.1	0	------	------	3	13.3	108.1
Proskowetz	893	------	------	------	19.6	14.6	0	------	------	3	11.4	92.7
Reed Triumph	889	------	------	------	18.9	14.1	0	------	------	3	11.0	89.4
Hanna	319	------	------	------	27.1	10.6	0	------	------	3	12.6	102.4
Svanhals	187	------	------	------	15.9	------	------	------	------	1	15.9	109.7
Nepal	595	------	------	------	19.7	16.2	0	------	------	3	12.0	97.6
Servian	915	------	------	------	26.0	9.0	0	------	------	3	11.7	95.1
Odessa	916	------	------	------	25.6	7.7	0	------	------	3	11.1	90.2
Manchuria	3167	------	------	------	20.8	20.4	0	------	------	3	13.7	111.4
Two-Row Hull-less	3180	------	------	------	12.9	------	------	------	------	1	12.9	89.0

Of the spring varieties tested, Featherston (C. I. No. 911) was the best. Manchuria (C. I. No. 3167) and Luth (C. I. No. 908) were second and third, respectively. These three belong to the Manchuria group. Hanna (C. I. No. 319) was the only 2-rowed variety that compared at all favorably with the 6-rowed sorts. The barleys of the Manchuria type are undoubtedly the best adapted spring varieties for this section. Although fairly high yields were obtained from some of these barleys, they were usually much diseased and had a great tendency to lodge. The use of spring barley is not generally advocated in this State. It is rather difficult to draw any definite conclusions from the table of yields as to the winter types best adapted to this section because of lack of information regarding the identity of the winter selections. In recent years, however, Union Winter has proved a superior sort. As Union Winter and Tennessee Winter are the most frost resistant of the winter varieties, they are likely to be the most successful in this humid region where heavy winterkilling is likely to occur every three or four years.

CLEMSON, S. C.

The annual yields of barley grown in 1912, 1914, and 1920 at Clemson, S. C. (Table 83), were furnished through the courtesy of the South Carolina Agricultural Experiment Station. Barley is a crop of little or no importance in South Carolina. All of the varieties tested were winter barleys and were fall sown. Tennessee Winter (C. I. No. 257) is the only variety tested for more than one year. Of the eight varieties grown in 1912 Tennessee Winter was outstanding, with a yield of 40.3 bushels. Alaska (C. I. No. 534) was second. There is little information about this variety, as it has not been generally distributed to the various stations. Both Han River (C. I. No. 206) and Greece (C. I. No. 221) produced yields of 32 bushels. The other varieties grown this year did not seem promising, yielding less than 30 bushels per acre. In 1914 four varieties were grown, but since only Tennessee Winter can be identified it is the only one included in the table. It yielded 21.1 bushels, which did not compare favorably with its yield in 1912. Two varieties, Virginia Hooded (C. I. No. 648) and Arlington Awnless (C. I. No. 702), were grown in 1920. Virginia Hooded produced a yield of 9.1 bushels, but Arlington Awnless failed entirely.

While the varieties in this experiment were not tested for a sufficient period to show their relative value, the results in 1914 and in 1920 were not promising. In 1912, on the other hand, they were quite good. It is the belief of the State officials that barley may be grown with success, but owing to the competition with other crops it is unlikely to be seeded in any considerable acreage.

TABLE 83.—*Annual yields of varieties of barley grown at the South Carolina Agricultural Experiment Station (at Clemson) in 1912, 1914, and 1920*

[Data furnished through the courtesy of the South Carolina Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)		
		1912	1914	1920
Han River	206	32. 0		
Greece	221	32. 0		
Bestehorn Giant	414	27. 9		
Tennessee Winter	257	40. 3	21. 1	
Winter Club	488	29. 9		
Wisconsin Winter	519	25. 5		
Alaska	534	38. 2		
Texas Winter	554	28. 9		
Virginia Hooded	648			9. 1
Arlington Awnless	702			0

ATHENS, GA.

The yields of barley varieties shown in Table 84 were obtained in cooperation with the Georgia State College of Agriculture. These varieties were grown during the years 1914 to 1921, inclusive. Unfortunately the barns were burned in 1921, destroying the entire crop for that year. The college farm at Athens is one of the few points in the South where barleys of the humid-winter type have been tested in sufficient numbers and for an adequate period of years to make definite conclusions possible. Nineteen varieties were tested in two or more of the seven years. Six were grown for the full period.

During the earlier years of the experiments five spring barleys, Bavarian (C. I. No. 159), Chevalier (C. I. No. 156), Hannchen (C. I. No. 531), Hanna (C. I. No. 287), and Princess (C. I. No. 529), were tested along with the winter varieties. Both Bavarian and Hannchen were continued for six years, but it is obvious that none of the spring varieties can compete successfully with the winter sorts. While Hannchen produced the third highest yield of all varieties grown in 1920, it was surpassed by a number of the winter sorts in all the other years.

Of the varieties grown for the seven years, Turkestan (C. I. No. 711) produced the highest average yield, 44.7 bushels. Tennessee Winter (C. I. No. 257) was almost its equal, with an average yield of 44.1 bushels. Wisconsin Winter (C. I. No. 519), which was third, was also a superior variety at Arlington Experiment Farm, near Washington, D. C. Argentine (C. I. No. 223), Mammoth Winter (C. I. No. 220), and Greece (C. I. No. 221) follow in the order named. None of the other winter varieties seems at all promising. Orel (C. I. No. 351), which has produced high yields at several of the stations as a spring variety and at others as a winter sort, does not appear to be hardy enough to withstand the winters here. Because of the absence of rough awns, Virginia Hooded (C. I. No. 648) and Arlington Awnless (C. I. No. 702) are desirable sorts, but they were very poor yielders, as was Tanbash (C. I. No. 578), a hull-less variety. These varieties have not been highly productive at any of the stations where they have been tested. Black Russian (C. I. No. 705), which was grown during the years 1916 to 1920, inclusive, produced only a fair average yield.

The results show conclusively that spring barleys are not at all dependable when fall sown at Athens. Turkestan, Tennessee Winter, and Wisconsin Winter were all satisfactory varieties well adapted to conditions here. The small acreage of barley grown in Georgia is largely of the Tennessee Winter type.

Table 84.—*Annual acre yields of varieties of barley grown at the Georgia State College (at Athens) in some or all of the seven years from 1914 to 1920, inclusive*

[Data obtained in cooperation with the Georgia State College of Agriculture. Yields in 1921 were destroyed by fire]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1914	1915	1916	1917	1918	1919	1920			
Turkestan	711	43.0	46.6	54.2	14.1	55.2	48.9	51.2	7	44.7	154.7
Tennessee Winter	257	40.6	43.8	61.5	8.6	70.8	43.2	40.4	7	44.1	152.6
Wisconsin Winter	519	35.1	44.0	57.9	11.7	56.3	42.1	37.7	7	40.7	140.8
Mammoth Winter	220	33.4	42.7	56.3	6.8	7.3	44.7	50.0	7	34.5	119.4
Argentine	223	33.0	41.9	55.3	0	39.8	50.0	44.5	7	37.8	130.8
Greece	221	30.2	39.8	39.6	4.2	20.0	39.0	44.4	7	31.0	107.3
Maryland Winter	518	23.9	34.1	------	------	------	------	------	2	29.0	93.9
Virginia Hooded	648	21.9	25.5	32.8	0	------	------	------	4	20.1	74.7
Arlington Awnless	702	------	22.9	37.0	0	4.2	------	26.3	5	18.1	63.9
Nesbian	647	31.5	32.7	36.0	0	0	------	------	5	20.0	76.6
Orel	351	20.8	33.5	26.6	0	11.9	------	41.1	6	22.3	79.6
Bavarian	159	16.9	36.7	35.4	0	4.7	29.3	------	6	20.5	75.1
Chevalier	156	16.6	35.7	------	------	------	------	------	2	26.1	84.5
Hannchen	531	21.3	29.7	27.1	0	6.3	------	7.7	6	22.0	78.6
Hanna	287	21.3	28.9	------	------	------	------	------	2	25.1	81.2
Princess	529	11.5	30.0	------	------	------	------	------	2	20.7	67.0
Tanbash	578	26.8	22.9	19.1	0	1.0	------	------	5	14.0	53.6
Black Russian	705	------	------	48.0	0	30.7	18.7	43.7	5	28.2	101.1
Nakano Wase (See Pl. III, fig. 1, D)	754	------	------	46.4	0	2.1	------	------	3	16.2	72.0

ASHBURN, GA.

The results at the substation at Ashburn, Ga., were obtained in cooperation with the Georgia State College of Agriculture. The yields of the barley varieties grown in the years 1915 and 1916 are shown in Table 85. With the exception of Nesbian (C. I. No. 647), all of the barleys were grown both years. Greece (C. I. No. 221) produced the highest average yield, with Orel (C. I. No. 351) second and Tennessee Winter (C. I. No. 257) third. Following Tennessee Winter were Argentine (C. I. No. 223) and Turkestan (C. I. No. 711). Arlington

Awnless (C. I. No. 702) and Tanbash (C. I. No. 578), a hull-less variety, produced the lowest yields in both years. Nesbian (C. I. No. 647), which was grown in 1916, was the second in rank that year. While a test in only two years does not show definitely the value of any particular variety, it does give a general idea of what varieties might be expected to yield well in this section.

Table 85.—*Annual acre yields of varieties of barley grown at the Ashburn (Ga.) substation in 1915 and 1916*

[Data obtained in cooperation with the Georgia State College of Agriculture]

Variety	C. I. No.	Acre yields (bushels)		Years grown.	Average yield (bus.)	Percentage of weighted mean
		1915	1916			
Greece	221	19.3	14.5	2	16.9	128.0
Argentine	223	18.7	9.3	2	14.0	106.1
Tennessee Winter	257	15.6	14.0	2	14.8	112.1
Orel	351	15.6	16.1	2	15.9	120.5
Turkestan	711	13.0	12.0	2	12.5	94.7
Arlington Awnless	702	9.4	8.8	2	9.1	68.9
Tanbash	578	8.3	8.0	2	8.1	61.4
Nesbian	647		15.6	1	15.6	126.8

QUITMAN, GA.

The yields of barley varieties grown at the Quitman substation during the year 1915 are found in Table 86. These yields were obtained in cooperation with the Georgia State College of Agriculture. Of the seven winter barleys grown in this year, Greece (C. I. No. 221) was the highest yielder, with Mammoth Winter (C. I. No. 220) and Argentine (C. I. No. 223) following. Orel (C. I. No. 351) and Tennessee Winter (C. I. No. 257) were fourth and fifth in point of yield. Tennessee Winter is usually relatively higher in rank at stations where humid-winter barleys are grown than it is here. A test of only one year is not sufficient to show which types are superior, but it is likely that the less dominant winter types are better adapted this far south.

Table 86.—*Annual acre yields of varieties of barley grown at the Quitman (Ga.) substation in 1915*

[Data obtained in cooperation with the Georgia State College of Agriculture]

Variety	C. I. No.	Acre yields (bushels)	Variety	C. I. No.	Acre yields (bushels)
Greece	221	8.1	Tennessee Winter	257	4.4
Mammoth Winter	220	7.8	Turkestan	711	4.3
Argentine	223	7.3	Wisconsin Winter	519	4.2
Orel	351	5.5			

MORGANTOWN, W. VA.

The yields of the barley varieties grown in 1921 at Morgantown were furnished through the courtesy of the West Virginia Agricultural Experiment Station. As very little barley is grown in this State, the experiments with this cereal have been very limited. The four varieties tested here were grown in rod rows replicated seven times. Manchuria (C. I. No. 244) produced the highest yield, 34.4 bushels. A 2-rowed barley, Chevalier (C. I. No. 278), was second in rank, with a yield of 32.7 bushels. Neither of the hull-less sorts, Himalaya (C. I. No. 620) and Nepal (C. I. No. 595), compared favorably with the two hulled varieties, Himalaya producing a yield of only 18 bushels and Nepal 13.6 bushels.

No data are available on which to base an opinion as to the value of winter varieties. At the higher elevations the spring varieties would likely be the better sorts, but at the lower elevations they would probably become badly diseased. This was the case in Kentucky and Virginia where spring barleys were tested. There the winter sorts proved to be superior.

LEXINGTON, KY.

The results at the Kentucky Agricultural Experiment Station at Lexington are shown in Table 87. These data, furnished through the courtesy of that station, include yields for seven of the years from 1910 to 1917, inclusive. In 1910 both winter and spring varieties were tested. The spring-sown barleys produced yields much higher than those sown in the fall, 1910 being one of the few favorable years for spring-sown varieties in this section. In 1911 the spring-sown varieties, with the exception of Franconian (C. I. No. 679), were grown in rod rows instead of in plats. The straw was unusually short and the yields very low. Franconian, which produced the high yield of 85.5 bushels in 1910, was again grown in 1911 and 1912, but was quite inferior in both these years. No further tests were made with spring-sown barleys.

It was soon found that the spring varieties when fall sown could not survive the winters. In 1910 both Hanna (C. I. No. 287) and Horsford (C. I. No. 610) were entirely winterkilled, and Odessa (C. I. No. 182) and Telli (C. I. No. 194) were excelled by the winter sorts. None of the spring barleys survived in 1911 and 1912.

Mammoth Winter (C. I. No. 220) and Tennessee Winter (C. I. No. 257) are the only winter varieties so far tested that have produced uniformly good yields. These varieties are almost identical. In 1912 a number of the winter barleys winterkilled, and none of these was given further trial. Beardless 20 (C. I. No. 2745), a hybrid variety, produced a yield of 40.8 bushels in 1917, which was less than that of Tennessee Winter.

Barley is a crop of minor importance in Kentucky. The spring varieties are very unreliable. Tennessee Winter and Mammoth Winter seem to be the most productive of the winter sorts, and what little barley is grown is of this type.

TABLE 87.—*Annual acre yields of varieties of barley grown at the Kentucky Agricultural Experiment Station (at Lexington) in one or more of the eight years from 1910 to 1917, inclusive*

[Data obtained through the courtesy of the Kentucky Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)							Years grown	Average yield (bus.)	Percentage of weighted mean
		1910	1911	1912	1913	1914	1915	1917			
Winter barley:											
Odessa	182	16.3	------	------	------	------	------	------	1	16.3	50.0
Telli	194	20.4	------	------	------	------	------	------	1	20.4	62.6
Mammoth Winter	220	40.0	25.0	31.0	69.0	28.7	51.2	------	6	40.8	176.6
Tennessee Winter	257	39.0	24.5	29.0	65.5	23.3	50.5	46.8	7	39.8	167.2
Hanna	287	0	------	------	------	------	------	------	1	0	----------
Maryland Winter	518	33.0	14.2	4.5	0	------	------	------	4	12.9	58.1
Texas Winter	554	42.5	17.1	11.0	52.0	13.3	------	------	5	27.2	123.1
Horsford	610	0	------	------	------	------	------	------	1	0	----------
Wisconsin Winter	519	30.5	22.9	26.7	49.0	------	------	------	4	32.3	145.5
Svanhals	187	------	0	------	------	------	------	------	1	0	----------
Princess	529	------	0	0	------	------	------	------	2	0	----------
Large-Grained Winter	408	------	22.8	30.0	47.5	16.4	------	------	4	29.2	170.8
Nesbian	647	------	0	0	------	------	------	------	2	0	----------
Arlington Awnless	702	------	0	0	------	------	------	------	2	0	----------
Hansee Hull-less	703	------	------	0	------	------	------	------	1	0	----------
Chevalier	156	------	------	0	------	------	------	------	1	0	----------
Virginia Hooded	648	------	------	0	------	------	------	------	1	0	----------
Orel	351	------	------	0	------	------	------	------	1	0	----------
Bavarian	159	------	------	0	------	------	------	------	1	0	----------
Pontius	731	------	------	0	------	------	------	------	1	0	----------
Turkestan	711	------	------	0	------	------	------	------	1	0	----------
Beardless 20	2745	------	------	------	------	------	------	40.8	1	40.8	93.2
Spring barley:											
Heil Hanna 3	682	40.5	------	------	------	------	------	------	1	40.5	124.2
Barbary	695	19.0	------	------	------	------	------	------	1	19.0	58.3
Kashmir	685	44.5	------	------	------	------	------	------	1	44.5	136.5
White Smyrna	655	47.5	------	------	------	------	------	------	1	47.5	145.7
Chile Common	663	28.5	------	------	------	------	------	------	1	28.5	87.4
Abyssinia	669	44.5	------	------	------	------	------	------	1	44.5	136.5
Do	672	25.5	------	------	------	------	------	------	1	25.5	78.2
Franconian	679	85.5	17.0	9.0	------	------	------	------	3	37.2	195.8
Heil Hanna 1	681	30.0	------	------	------	------	------	------	1	30.0	92.0

KNOXVILLE, TENN.

The annual yields of barley in varietal experiments at the Tennessee Agricultural Experiment Station, Knoxville, furnished through the courtesy of this station, are presented in Table 88. While the plat experiments have not been so extensive here as at some of the other southern stations, much work has been done in breeding and selecting winter varieties for general cultivation in the warm and humid regions of the South. Tennessee undoubtedly has the largest winter-barley acreage of any humid State. The parent stock of Tennessee Winter (C. I. No. 257) has been the common barley in this region. This variety, as improved by mass selection at this station, was first distributed about 1900 as "Tennessee Winter." Several hooded hybrids which seem promising as winter barleys have been developed and distributed to other stations and to farmers.

Table 88 shows that Union Winter (C. I. No. 583), a barley of the Tennessee Winter group, is the only variety grown during the full period of the experiment. Tennessee Winter (C. I. No. 257), however, was grown for 11 of the 14 years, so that a fair comparison of the yields of the two varieties can be made. Union Winter undoubtedly is the higher yielding of the two at this station for this period. It produced an average acre yield of 42.8 bushels, as compared with 39.9 bushels for Tennessee Winter. In general appearance these varieties are quite similar, although Union Winter is a few inches shorter and several days earlier than Tennessee Winter.

Four varieties were introduced in 1908. Of these, Tenarab (C. I. No. 662) was the only one that was further tested, being grown in 1910 and 1911. In all of the three years it was inferior to both Union Winter and Tennessee Winter. Maryland Winter (C. I. No. 518) yielded 65.2 bushels in 1908, which was the highest that year. Bestehorn Giant (C. I. No. 414) and Black Winter (C. I. No. 337) were both quite inferior to the other four varieties. Beardless 20 (C. I. No. 2745), grown in 1913, 1914, 1916, and 1920, and Beardless 6 (C. I. No. 2746), grown in 1920 and 1921, are hooded selections made from a number of hybrids between Tennessee Winter × Horsford and Union Winter × Horsford. According to C. A. Mooers, of this station, Beardless 20 has been distributed to some of the farmers in the vicinity and is being more extensively cultivated. On poor or average land it produces nearly as much grain as Union Winter, with a larger yield of hay of superior quality. It does not stand wet-land conditions well, however. Beardless 6, although inferior to Beardless 20 in 1920, according to Professor Mooers, is "more robust and has greater capacity to produce both grain and straw. It also stands wet-land conditions well." Neither of these varieties was the equal of Union Winter or Tennessee Winter at this station in the years when comparable yields were obtained.

TABLE 88.—*Annual acre yields of varieties of barley grown at the Tennessee Agricultural Experiment Station (at Knoxville) in one or more of the 22 years from 1900 to 1921, inclusive*

[Data obtained through the courtesy of the Tennessee Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)														Years grown	Average yield (bus.)	Percentage of weighted mean
		1900	1901	1902	1903	1904	1908	1910	1911	1912	1913	1914	1916	1920	1921			
Tennessee Winter	257	58.9	30.0	54.5	21.9	28.1	63.3	33.9	44.5	30.2	----	----	29.5	44.2	----	11	39.9	98.5
Union Winter	583	71.1	27.1	54.2	41.7	35.4	57.5	34.6	44.5	27.6	43.7	54.2	33.0	50.9	23.7	14	42.8	106.5
Tenarab	662	----	----	----	----	----	53.2	32.8	39.1	----	----	----	----	----	----	3	41.7	96.7
Bestehorn Giant	414	----	----	----	----	----	29.0	----	----	----	----	----	----	----	----	1	29.0	60.3
Maryland Winter	518	----	----	----	----	----	65.2	----	----	----	----	----	----	----	----	1	65.2	135.6
Black Winter	337	----	----	----	----	----	20.2	----	----	----	----	----	----	----	----	1	20.2	42.0
Beardless 20	2745	----	----	----	----	----	----	----	----	----	37.5	49.0	27.5	37.4	----	4	37.9	94.3
Beardless 6	2746	----	----	----	----	----	----	----	----	----	----	----	----	34.9	21.9	2	28.4	80.0

It is evident from these results and from the types in general cultivation that the Tennessee Winter barleys are well adapted to growing conditions in Tennessee. While the hooded hybrids developed here are recommended especially for hay and on poor lands, none has yet been found that will produce as much grain on fertile soil as varieties of the Tennessee Winter group.

JACKSON, TENN.

Two varieties of barley, Union Winter (C. I. No. 583) and Beardless 20 (C. I. No. 2745), were tested at the Jackson substation during the years 1915, 1916, 1917, 1919, 1920, and 1921. The yields of these varieties (Table 89) are used through the courtesy of the Tennessee Agricultural Experiment Station. Union Winter produced an average yield of 19. 5 bushels for the six years, as compared with 16.5 bushels for Beardless 20. At Knoxville Union Winter was superior to all other varieties tested. It is a barley of the Tennessee Winter group which seems to be particularly well adapted to this region. Beardless 20, a hooded variety, produced good yields in all of the years it was grown with the exception of 1920. The hooded winter barleys are not, however, as high yielding as those of the Tennessee Winter type.

TABLE 89.—*Annual acre yields of varieties of barley grown at the Jackson (Tenn.) substation in six of the seven years from 1915 to 1921, inclusive*

[Data obtained through the courtesy of the Tennessee Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)						Years grown	Average yield (bus.)	Percentage of weighted mean
		1915	1916	1917	1919	1920	1921			
Union Winter	583	19. 2	22. 0	11. 5	22. 5	19. 2	22. 9	6	19. 5	108. 3
Beardless 20	2745	20. 0	13. 3	14. 2	25. 6	7. 9	18. 0	6	16. 5	91. 7

FAYETTEVILLE, ARK.

The data from the Arkansas Agricultural Experiment Station at Fayetteville were furnished through the courtesy of that station. Only winter barley was grown, usually in connection with experiments with winter wheat and oats. Comparative tests of these three cereals were conducted during the period from 1915 to 1921, inclusive. According to information received from this station, good stands were established each season. No winterkilling due to low temperature or to heaving was observed. The crop proved more hardy than Turf oats, but is less hardy than either winter wheat or rye. Arkansas undoubtedly is in the humid winter-barley district where the varieties of the Tennessee Winter type are probably the ones generally cultivated. As this was not a varietal experiment, no varietal names were mentioned in the data received.

STILLWATER, OKLA.

The data on barley yields at Stillwater, Okla., were furnished through the courtesy of the Oklahoma Agricultural Experiment Station. While these data were not adequate for tabulation, they are of enough significance to warrant consideration. Barley is becoming much more important as a feed crop in this section, but the experiments with this cereal so far have been very limited. For this reason any information as to types grown is of value.

In 1920 the best results were obtained from the fall-sown varieties. A yield of 53.3 bushels was procured from a 6-rowed club barley, which is probably the variety known as Winter Club. It has been grown for many years in small localized areas in the Western States, particularly in Utah, where it is known as Utah Winter. Another 6-rowed variety, thought to be a barley of the Tennessee Winter group, is commonly grown in the vicinity of Stillwater. It produced the relatively low yield of 26 bushels, but an improved selection of this variety yielded 32.2 bushels. The barleys sown in the spring of 1920 were practically failures. Scarcely more than enough seed for 1921 was obtained from these plats.

The fall-sown barleys also were the higher yielding sorts in 1921. The common 6-rowed barley, which is thought to be of the Tennessee Winter type, yielded 36.6 bushels. It was again surpassed by the improved strain just mentioned, which this year produced 50.1 bushels. Results with the spring varieties were somewhat better than in 1920, although they did not compare favorably with the winter sorts. The acre yields varied from 3.2 to 17.1 bushels.

It is evident that the fall-sown barleys are more successful than the spring-sown sorts in the vicinity of Stillwater. According to Adrian Daane, of the Oklahoma station, relatively good yields have been obtained from the spring varieties when fall sown in the eastern part of the State, where they furnish winter pasture and later a crop of grain. In western Oklahoma the spring sorts, Coast and Stavropol, are probably grown along with the winter barleys of the Tennessee Winter type. Both Coast and Stavropol are extensively grown in western Kansas and have spread southward through Oklahoma into northern Texas. Barley as feed is considered an excellent substitute for kafir and corn where these crops have failed.

TEXAS

Experimental data on barley production in Texas are very limited. Most of the varietal records were obtained 15 or 20 years ago. It would appear that barley is not an important crop in Texas. According to A. H. Leidigh, agronomist, College Station, Tex., "From a practical standpoint, everything centers around Tennessee Winter barley. Possibly, however, there are indications of the importance of other things."

Most of the barley acreage is in northwestern Texas adjacent to Oklahoma, where the Stavropol and Coast varieties of western Kansas and Oklahoma probably might be grown. On the remainder of the acreage Tennessee Winter doubtless is the prevailing type.

NEW HOPE, TEX.

The barley yields recorded at New Hope, near Dallas, in 1903 and 1904 are shown in Table 90. These yields were obtained in cooperation with the Texas Agricultural Experiment Station. Nine varieties were grown for the two years, but the period is too short to justify the drawing of reliable conclusions. The two varieties which produced the best average yields were Svanhals (C. I. No. 187) and Hanna (C. I. No. 203), both of which are 2-rowed humid-spring sorts usually grown in cooler regions of the North. Telli (C. I. No. 194), a barley of the Coast type, was third, and Bohemian (C. I. No. 188), another barley of the Hanna group, was fourth in point of yield. None of the varieties of the Tennessee Winter group were included in the test. While the spring barleys appear to have produced high yields in the two years they were grown, the period was not of sufficient length to establish their value. These same barleys have not generally shown themselves adapted to cultivation under climatic conditions such as exist here.

TABLE 90.—*Annual acre yields of varieties of barley grown at New Hope, Tex., in 1903 and 1904*

[Data obtained in cooperation with the Texas Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)		Years grown	Average yield (bus.)	Percentage of weighted mean
		1903	1904			
Beldi Dwarf	190	63.6	20.0	2	41.8	87.1
Telli	194	74.5	34.0	2	54.3	113.1
Chevalier II	200	59.3	45.0	2	52.1	108.5
Svanhals	187	74.5	40.0	2	57.3	119.4
Kitzing	189	60.0	35.0	2	47.5	99.0
Hanna	203	70.3	40.0	2	55.1	114.8
Bohemian	188	58.1	46.0	2	52.1	108.5
Hankow	197	36.1	20.0	2	28.1	58.5
Do	192	51.1	37.0	2	44.1	91.9

MARILLO, TEX.

The data from the Amarillo Cereal Field Station found in Table 91 were obtained independently by the Office of Cereal Investigations. In 1906 and 1907 six varieties were grown, and all except Tennessee Winter were spring sorts. Tennessee Winter (C. I. No. 257) was the only variety tested for the entire period from 1906 to 1919, inclusive. In 1906 the spring barleys did not compare at all favorably with Tennessee Winter, but in the following year the latter entirely winterkilled. While it produced high yields in some of the years, it gave little or no return in others. Winterkilling occurs too often here for the safe cultivation of winter varieties. The spring sorts tested all produced poor yields. Barleys of the Coast and Stavropol types should do better than those tried. These varieties, however, were not included in the experiments.

TABLE 91.—*Annual acre yields of varieties of barley grown at the Amarillo (Tex.) Cereal Field Station in some or all of the 14 years from 1906 to 1919, inclusive*

[Data obtained in cooperation with the Texas Agricultural Experiment Station]

Variety	C.I. No.	Acre yields (bushels)														Years grown	Average yield (bus.)	Percentage of weighted mean
		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919			
Tennessee Winter	257	23.9	0	22.5	0	3.1	14.1	10.6	6.3	35.1	24.6	6.6	16.3	0	25.7	14	13.5	143.6
Horsford	507	6.3	3.4	----	----	----	----	----	----	----	----	----	----	----	----	2	4.9	96.1
Hanna	203	3.5	2.2	----	----	----	----	----	----	----	----	----	----	----	----	2	2.9	56.9
Manchuria	244	3.3	2.9	----	----	----	----	----	----	----	----	----	----	----	----	2	3.1	60.8
White Smyrna	195	1.8	6.2	----	----	----	----	----	----	----	----	----	----	----	----	2	4.0	78.4
Club Mariout	261	2.3	5.0	----	----	----	----	----	----	----	----	----	----	----	----	2	3.7	72.5

CHANNING, TEX.

The data on the varietal experiments at Channing, Tex., were obtained in cooperation with the Capitol Syndicate Freehold Land & Investment Co. on the X. I. T. Ranch. The yields of these varieties for the years 1905 and 1906 are shown in Table 92. In 1905 one winter and four spring barleys were grown. Club Mariout (C. I. No. 261) and White Smyrna (C. I. No. 195) produced the highest yields. Tennessee Winter (C. I. No. 257) was third in rank. The humid-area spring varieties, Manchuria (C. I. No. 244) and Hanna (C. I. No. 203), did not compare favorably with these other sorts. Horsford (C. I. No. 507) was introduced in 1906. It yielded only 8.5 bushels, as compared with 25.1 bushels for Tennessee Winter. As the climatic conditions at Channing and Amarillo are quite similar, it is likely that winter barley would be too frequently winterkilled for successful cultivation. The Coast and Stavropol barleys might be successful here.

TABLE 92.—*Annual acre yields of varieties of barley grown at Channing, Tex., in one or both of the years 1905 and 1906*

[Data obtained in cooperation with the Capitol Syndicate Freehold Land & Investment Company]

Variety	C. I. No.	Acre yields (bushels)		Variety	C. I. No.	Acre yields (bushels)	
		1905	1906			1905	1906
Tennessee Winter	257	11.4	25.1	Manchuria	244	8.5	--------
White Smyrna	195	12.5	--------	Hanna	203	5.7	--------
Club Mariout	261	12.7	--------	Horsford	507	--------	8.5

STATE COLLEGE, N. MEX.

The annual yields of barley varieties grown at the New Mexico Agricultural Experiment Station were obtained through the courtesy of that station. These yields for five years, 1913, 1916, 1917, 1920, and 1921, are shown in Table 93. All of the varieties grown during the years 1913, 1916, and 1917 were spring sorts, although they were fall sown. Of these Scotch (C. I. No. 848) produced the highest average yield for the three years. Frankish (C. I. No. 207) was second, and Six-Row (C. I. No. 2811), a barley of unknown identity, was third in point of yield. With the exception of Coast and Telli, however, all these varieties are humid-area spring sorts, and when fall sown or winter sown they produce an excessive growth, thus making their chances of winterkilling much greater. This was the cause of the very low yields in 1916.

The varieties tested in 1920 and 1921 with the exception of Coast were all winter sorts. Tennessee Winter (C. I. No. 257) far exceeded all others with an average yield of 74.5 bushels, as compared with 58.5 bushels for O. A. C. Selection 7 (C. I. No. 2814), its nearest competitor. Coast (C. I. No. 690) was third in rank. In 1913, however, the two Coast barleys, Telli and Coast, were the lowest yielding sorts.

Barley as an agricultural crop in New Mexico is of only minor importance. It is grown largely for winter pasturage. Although Tennessee Winter was not sufficiently tested at this station to determine its relative importance, it is both high yielding and winter hardy and is probably unequaled for the purpose for which barley is usually grown in this State. For this reason State College is considered with the stations in the winter-barley region, although ecologically it belongs in the Coast region.

TABLE 93.—*Annual acre yields of varieties of barley grown at the New Mexico Agricultural Experiment Station (at State College) in one or more of the nine years from 1913 to 1921, inclusive*

[Data obtained through the courtesy of the New Mexico Agricultural Experiment Station]

Variety	C. I. No.	Acre yields (bushels)					Years grown	Average yield (bus.)	Percentage of weighted mean
		1913	1916	1917	1920	1921			
Frankish	207	51. 1	9. 5	40. 4	--------	--------	3	33. 7	111. 6
Coast	690	28. 1	--------	--------	55. 6	56. 6	3	46. 8	95. 1
Six-Row	2811	61. 6	9. 7	25. 7	--------	--------	3	32. 3	107. 0
Bavarian	208	43. 1	--------	--------	--------	--------	1	43. 1	102. 4
Scotch	848	59. 9	8. 3	34. 6	--------	--------	3	34. 3	113. 6
Hull-less	2812	29. 7	6. 9	22. 5	--------	--------	3	19. 7	65. 2
Telli	194	21. 5	--------	--------	--------	--------	1	21. 5	51. 1
Maryland Winter	518	--------	--------	--------	51. 6	46. 2	2	48. 9	92. 3
Nakano Wase (See Pl. III, fig. 1, D)	754	--------	--------	--------	14. 6	--------	1	14. 6	26. 6
Wisconsin Winter	519	--------	--------	--------	51. 5	37. 1	2	44. 3	83. 6
Tennessee Winter	257	--------	--------	--------	83. 1	66. 0	2	74. 5	140. 6
O. A. C. Selection 8	2813	--------	--------	--------	61. 5	47. 7	2	54. 6	103. 0
O. A. C. Selection 7	2814	--------	--------	--------	66. 0	51. 1	2	58. 5	110. 4

REGIONAL ADAPTATION OF VARIETIES

In order to make the discussion of results at each station fairly complete, statements of the adaptation of varieties and types have been repeated throughout the bulletin. When the results of all the stations are brought together they should enable one to map the various regions of barley culture. There are many difficulties, however, in mapping. The boundary lines are intangible and fluctuate from year to year according to the season. The data available are often fragmentary or for so few years as to be inadequate. The boundaries themselves do not separate the regions of adaptation of one type from that of another. There are lines where two well-adapted types are equal in value and on each side of which either produces good yields. Often types of probable high yield have not been tested or have been inadequately tested. It is possible that in many cases the most desirable sorts have never been introduced into America. For these reasons the history of barley cultivation and of varieties is a very desirable background for defining present limits.

The regions are most easily separated on a basis of rainfall and temperature. In States east of the Rocky Mountains rains occur during the growing season. In this district of summer rainfall there are three distinct subdivisions: (1) Those States north of the Ohio River extending from the Atlantic seaboard to the northern Great Plains area, (2) the States of the northern Great Plains, and (3) the Southern States.

The Northeastern States are characterized by moderate summer temperature and an ample summer rainfall. This area includes the most important barley-producing center east of the Rocky Mountains. On the northern Great Plains there is precipitation during the summer, but the quantity is considerably less than in the Northeastern States, and droughts are frequent. In the Southern States the summers are hot, and the winters are sufficiently mild for the growing of winter varieties.

West of the Rocky Mountains the rainfall occurs during the winter season, and the crop ripens during hot dry weather.

SPRING BARLEYS FOR HUMID AREAS

In the earlier years in New England the 2-rowed barleys of the Thorpe and Chevalier types predominated. The barley acreage now has almost disappeared. New York was for many years an important center of production. Both soil and climate are suited to the growing of barley, which was in great demand for brewing and malting purposes. As has been previously stated, the types grown in these earlier years were doubtless the 2-rowed Hanna and Chevalier and a 6-rowed barley of unknown identity, probably brought from western Europe and northern England. At the present time types adapted to general farming, such as Manchuria and Hanna, usually are grown. To supply the demand for feed in the dairy industry the acreage sown to these varieties has been considerably increased in recent years. In Pennsylvania, where barley cultivation is of only local importance, the varieties are of the same general types as in New York.

In the upper Mississippi Valley the Manchuria-Oderbrucker varieties have been grown almost exclusively for many years. The earlier agricultural records show that a 6-rowed barley which was probably quite similar to the varieties now grown commercially was in cultivation there.

Numerous experiments at the stations in the various States have been conducted for a sufficient number of years to prove beyond doubt that the Manchuria-Oderbrucker types are best adapted to the region. The pioneer stations in barley experimentation were those in Wisconsin, Minnesota, and North Dakota. The first experiments at Madison, Wis., were conducted in 1870; at Fargo, N. Dak., in 1892; and at St. Paul, Minn., in 1893. At these stations the Manchuria-Oderbrucker varieties were superior to all others tested. From the types grown in the various localities and from the results at the various stations, boundaries can be defined.

Spring barleys adapted to humid climates are grown in the northeastern part of the region of summer rainfall. This area (fig. 10) is arbitrarily bounded by a line starting near Indian Head, Saskatchewan, crossing the northern boundary of North Dakota near the Montana line, running diagonally to southeastern South Dakota, and continuing to southeastern Iowa. Then crossing Illinois and Indiana it divides these two States in halves. It then curves northward to the more favorable soils of the upper counties of Ohio, thence southward to central Pennsylvania and east to the coast. The accompanying map shows that this humid spring-barley region extends far into Canada. In most of this region the barleys are of the Manchuria type, although in a small area in Maine and southeastern Canada Chevalier is grown and there is a considerable acreage of Hanna and other 2-rowed barleys in New York and Pennsylvania.

Just west of this humid region is an area of summer rainfall where the precipitation is quite light. Here a number of 2-rowed varieties do particularly well. This is the largest area in the United States suited to the growth of the 2-rowed sorts. It includes southwestern Iowa, northwestern Missouri, all of Nebraska, extensive areas in the western parts of the Dakotas, the northeastern half of Wyoming, and all of Montana with the exception of a western fringe. It extends far into Canada, embracing all the territory west of Indian Head, Saskatchewan, to the mountains, and theoretically should connect with the Chevalier district of the extreme eastern Provinces by crossing above the central Manchuria area. All of the 2-rowed barleys grown here except White Smyrna are spring sorts adapted to humid climates. In Montana, where it is cool and the days are long, the varieties of the Chevalier group are grown quite successfully. They are even more successful in Canada, where these conditions are intensified. In those portions of Wyoming, North Dakota, South Dakota, and Nebraska adapted to 2-rowed barleys Hannchen and White Smyrna are superior sorts, Hannchen producing higher yields where there is more moisture. The Thorpe barleys have been tested in the

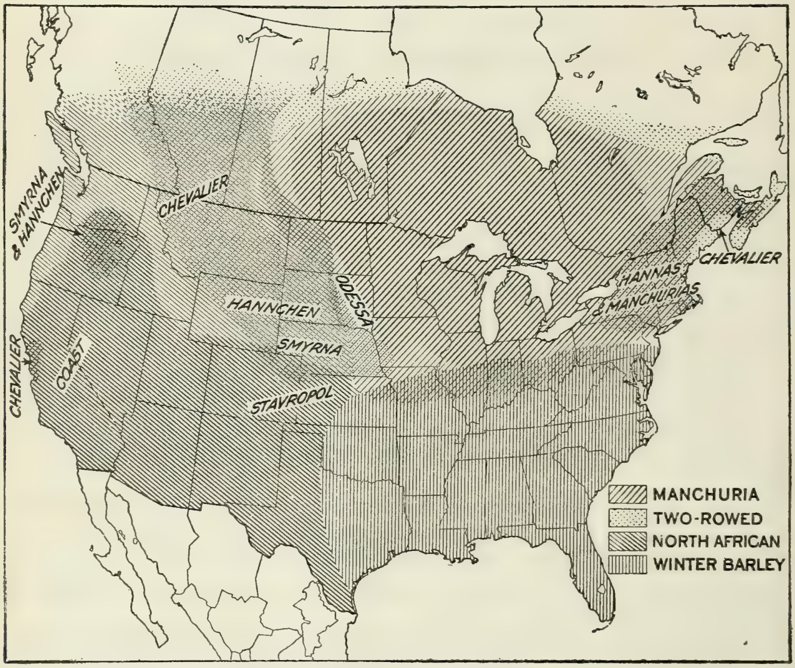


FIG. 10.—Map of the United States and Canada showing the areas and sections to which groups of barleys are adapted

northern part of this region, but have not proved superior to Hannchen or the Chevalier varieties.

In addition to the areas mentioned, 2-rowed barleys do well in two districts in the West. In Washington and Oregon there is a district including Moro, Union, and Burns, Oreg., where Smyrna and Hannchen produce high yields, while in a part of the Salinas Valley of California practically the only variety grown is a Chevalier barley.

There are thus three distinct centers where different types of barleys adapted to humid climates seem to do particularly well. These are (1) the Northeastern States, where Hanna and Manchuria do equally well; (2) the upper Mississippi Valley, where the Manchuria-Oderbrucker barleys predominate; and (3) the large area west of the upper Mississippi Valley, where the 2-rowed barleys are well adapted, an area included with these districts for two reasons. The rainfall, although too light to characterize the region as really humid, is a summer rainfall, nevertheless. Many of the varieties grown are those originating in humid climates.

The difficulty of defining either the regions or the range of varieties is apparent. The Hanna and Chevalier barleys succeed along the Atlantic seaboard from New England to Prince Edward Island, because the summers are somewhat similar to the cool rainy summers of northern Europe, whence they came. These conditions are partially fulfilled in the northern Great Plains, where there are sections in which they do well despite the lower rainfall and lesser humidity. In part of this latter area White Smyrna from the dry coast of Asia Minor grows well in the same district as Hannchen from Sweden.

In the same way the growth of plants on soils of low water content, as found in the West where the rainfall comes in winter, is duplicated east of the Rocky Mountains on the western Plains, where the rainfall is light and comes in summer. The coast district overlaps the western 2-rowed area. Farther south, in western Kansas and adjoining sections, it similarly overlaps the border of the humid-spring region. In this section Coast and Stavropol, allied varieties tolerant of more humid conditions, are largely grown, and this section is pertinently considered with the western region.

SPRING BARLEYS FOR SEMIARID AREAS

West of the Rocky Mountains, Coast is the dominant commercial variety, constituting most of the acreage. East of the mountains in the Great Plains area its acreage exceeds that of all other semiarid barleys, if Stavropol, which is of Russian origin, is excepted. Because of the extreme variation in the topography and of the precipitation of the region, numerous varieties other than Coast and Stavropol are cultivated. Many of these are 6-rowed barleys of North African origin. In western Kansas and southern Nebraska the similar varieties Stavropol and Coast are widely cultivated. A small part of the Colorado acreage is devoted to the growing of hull-less varieties. In Colorado, Nebraska, Wyoming, Montana, and the western Dakotas the 2-rowed humid-spring types already discussed and a number of other types occur. Chief among these are Coast, White Smyrna from Asia Minor, Club Mariout of the North African group, and Trebi from Asiatic Turkey, the latter usually grown under irrigation. In Idaho, Oregon, and Washington Coast is the dominant variety, although Trebi, White Smyrna, Club Mariout, Beldi Giant, and other varieties of the Coast type are promising. In California the barley acreage and production exceed those of any other State. By far the most important variety is Coast. California Mariout is grown in parts of the interior valleys where warmer and drier conditions prevail. There is an increasing acreage of Club Mariout in the Sacramento Valley and in the northern portion of the San Joaquin Valley, where it brings good prices for export.

WINTER BARLEYS FOR HUMID AREAS

The humid winter-barley region extends from the Atlantic seaboard to western Texas and as far north as central Ohio, including several very different areas: The Piedmont, the Coastal Plain, the southeastern mountain section, the Ohio Valley, and the southern area west of the Mississippi. Winter barleys are grown in only a few sections of the South, the center of production being in Tennessee.

Experiments in this region have been few. Occasional satisfactory yields have been obtained, but the available information is so meager that conclusions are quite untrustworthy. The fact that barley is not grown is an indication of its lack of suitability.

The potential economic importance of barley in the Coastal Plain section is great. Most of the hogs of this plain are fattened on peanuts, resulting in soft pork. Barley is one of the best of all feeds for hardening pork. Where it can be grown here it will assist greatly in establishing the hog industry on a satisfactory basis. Unfortunately barley is not very promising when grown under Coastal Plain conditions.

Much higher yields have been obtained in the Piedmont region. This section is much better suited to production than the Coastal Plain, but even here barley does not grow particularly well.

In eastern Tennessee barley is an important crop. Here both climatic and soil conditions are favorable. The dominating variety is Tennessee Winter, the most frost-resistant variety known in humid climates. Recently Professor Mooers, of the Tennessee Agricultural Experiment Station, has developed some hooded hybrids which seem to be true winter barleys and have done well in Tennessee.

The northern limit of safe cultivation of Tennessee Winter barley is rather indefinite. Besides the area under cultivation in Tennessee, some winter barley is grown commercially in Ohio, and there is even a small acreage in Michigan. Barley winterkills, however, in Kentucky and is grown but rarely in northern Ohio. The southern limit of winter-barley production is equally indefinite. The true winter sorts are unquestionably the ones best adapted to Ohio, Tennessee, and northwestern Georgia. South of this area it is probable that fall-sown spring varieties are better adapted, although information on this point is very limited. Experiments were conducted at Tifton, Ga., in 1921 in cooperation with the experiment station at that point. Spring barleys responded favorably to the early season which occurred that year, while the winter forms remained dormant until the days were of sufficient length to induce flowering. Spring barleys under these conditions might be caught by late frosts and in the long run prove unsuited. With the information available, however, spring sorts appear to be worthy of extensive trials on the southern Coastal Plain. Yields equal to those obtained in Minnesota and Wisconsin can hardly be expected, as the soil type is not one to which barley is well adapted, and the climatic conditions are unquestionably more adverse.

East of the Mississippi River there is a conspicuous gap between the winter and spring areas. Spring barley is at present grown extensively in northern Illinois, Indiana, and Ohio. South of this section little barley, either spring or winter, is grown until the winter-barley district of Tennessee is reached. On the Great Plains the spring-sown semiarid forms and the fall-sown humid forms of the Tennessee Winter type overlap. In western Oklahoma and southwestern Kansas both types are grown. Winter barley also is cultivated on the Plains in Texas.

WELL-KNOWN OR PROMISING VARIETIES

At various times varieties of barley have been introduced into the United States or developed at the agricultural experiment stations. Some of these disappeared quickly, while others were tested for long periods at many stations. The number of varieties which had been tested up to 1921 was so large that no attempt has been made to describe them individually. From this number, however, a few of the more important and better known varieties were chosen for the purpose of amplifying the meager details mentioned in describing the results at the several stations.

The varieties are not presented in the order of their Cereal Investigations (C. I.) numbers. This arrangement, perhaps, would have been the most desirable in checking references arising within the text of the bulletin. For any question arising outside this discussion the varieties are more easily found when arranged in related groups. Thus, in the following descriptions the Chevalier barleys are grouped together, as are the Manchuria varieties, etc. Where it is desired to check varieties by the Cereal Investigations numbers they will be found in numerical order in Table 99, in which also is inserted a reference to the varietal description under this heading.

TWO-ROWED HULLED AWNED BARLEYS

CANADIAN THORPE (C. I. NO. 740)

A variety known as Canadian Thorpe has been widely tested at stations in Canada and has been grown on a few experiment stations in the United States. It is a barley of the Thorpe type. According to Dr. C. E. Saunders, " Canadian Thorpe was introduced into Canada many years ago by a Canadian seedsman and is essentially identical with Duckbill." The original Canadian Thorpe produced good yields in the western prairie Provinces. Selections were made from the Canadian Thorpe, which Seager Wheeler, of Rosthern, Saskatchewan, considered to be superior to the original variety. This barley was grown at Moccasin, Mont., for three years. During these years its yield was 98 per cent of that of the weighted mean of all varieties.

INVINCIBLE (C. I. NO. 590)

Invincible (C. I. No. 590) was originated by the Garton Brothers, seedsmen, of England. It came from a compound cross, Chevalier × Golden Melon, crossed on Standwell. Invincible is a late 2-rowed variety of the Goldthorpe type. It has large straw and a dense spike. It produced relatively higher yields in Canada than in the United States.

STANDWELL (C. I. NO. 584)

Standwell is a hybrid barley which has been classed in the Thorpe group in this bulletin. It was produced by Garton Brothers, of England. It came from a cross, Fan × Golden Melon. It may not be entirely consistent to place Standwell and Invincible in the Thorpe group, as they might more consistently be placed with the hybrids. It is entirely possible, however, that the entire group was of hybrid origin. Those standard varieties of England with wide spikes may very easily have come from accidental hybrids. While this type is a desirable one in England there is no area in the United States to which it is well adapted.

SVANHALS (C. I. NO. 187)

Originated by the Svalof Plant-Breeding Association, Svalof, Sweden, Svanhals (C. I. No. 187) was first introduced into the United States by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture in March, 1901. It was reintroduced in 1906 as C. I. No. 605. In Sweden this variety was considered suited to cold wet land. It was not there believed to be the equal of Princess (C. I. No. 529) or of Chevalier II (C. I. No. 200).

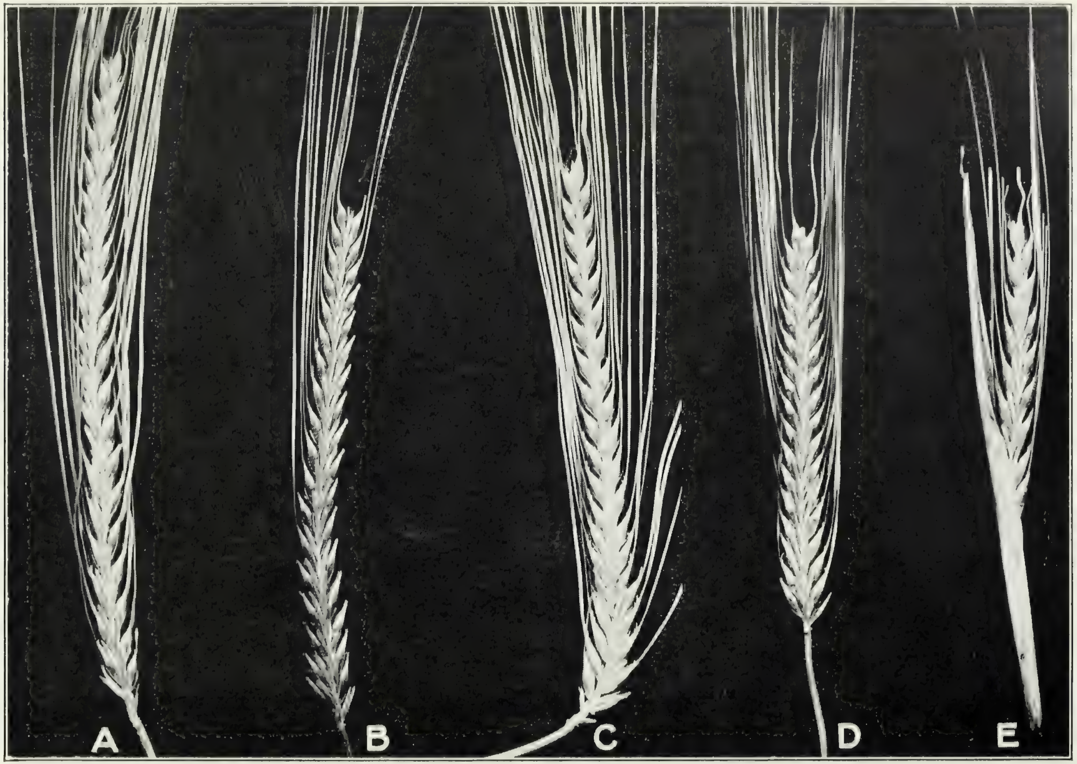
In the United States it has been superior to both these varieties at almost all places. It has proved to be adapted to an unexpectedly wide range, producing relatively good yields in the northern Great Plains and also under irrigation farther west. Svanhals has been grown to some extent in field culture, as shown in Plate I, D. It is a 2-rowed barley with a dense spike, similar to Thorpe, but ripens earlier than the Thorpe barleys. The density of Svanhals was about 2.6 millimeters in an ordinary year at Aberdeen, Idaho.

EARLY CHEVALIER (C. I. NO. 2725)

According to the Canadian Experimental Farms Report of 1908 Early Chevalier (C. I. No. 2725) is a selection from French Chevalier made in 1904 on account of earliness and strength of straw. While it has many of the characters of Chevalier, it is hardly typical of that variety. The spikes are somewhat wider at the base than is the case with most varieties of the Chevalier group. Early Chevalier is one of the highest yielding sorts at Cap Rouge. It has not been as widely tested in Canada as many of the other varieties.

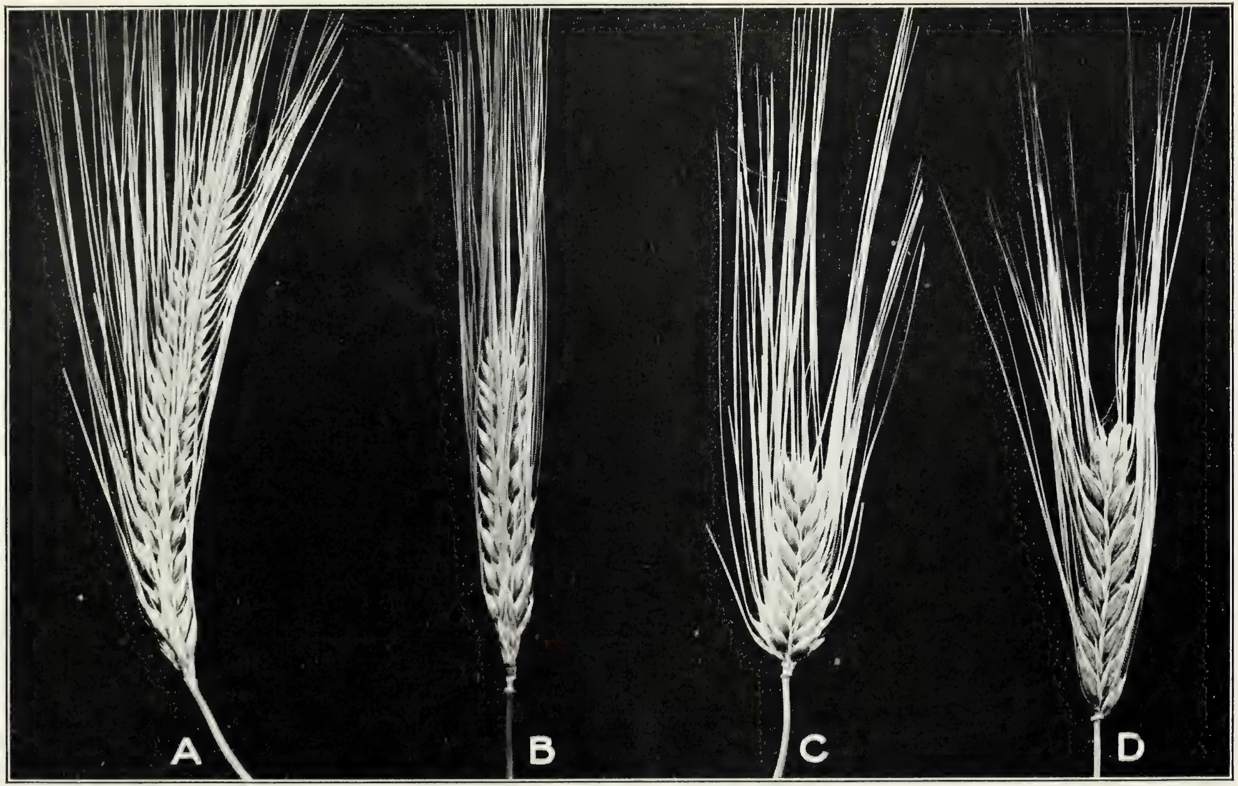
FRENCH CHEVALIER (C. I. NO. 175)

A barley known as French Chevalier was widely tested at stations in Canada. It is mentioned in the Canadian Experimental Farms Report of 1892. This variety also was grown at a number of stations



HEADS OF TWO-ROWED BARLEY VARIETIES

A, Chevalier II (C. I. No. 200), an English brewing barley adapted to sections with cool summer temperatures in Canada and the United States; B, Hannchen (C. I. No. 531), a Swedish brewing barley adapted to sections with summer temperatures slightly higher than those suited to Chevalier; C, Alpha (C. I. No. 959), a barley of recent hybrid origin not yet widely distributed, promising in New York State; D, Svanhals (C. I. No. 187), a Swedish variety adapted to much the same sections as Hannchen; E, White Smyrna (C. I. No. 195), from Asia Minor, widely adapted to the drier sections of the United States



HEADS OF BARLEY VARIETIES.—I

A, Manchuria (C. I. No. 244), a barley of the Manchuria group of varieties grown on most of the barley acreage of the northern Mississippi Valley where the summers are hot and humid; B, Coast (C. I. No. 690), a barley of the Coast group of varieties grown on most of the barley acreage of the Western States where the grain ripens during a season of low rainfall; C, Club Mariout (C. I. No. 261), an Egyptian variety with requirements similar to those of Coast, commercially grown in California; D, California Mariout (C. I. No. 1455), a dry-land variety from the Egyptian seacoast suited to conditions of very low rainfall, especially in California in the United States. Both the original variety and selections from it are still being grown. The French Chevalier itself, while a very good variety, has not been outstanding at any one point. At Nappan, Nova Scotia, it produced good yields, but not so good as Mensury (C. I. No. 2657). This is not surprising, as the number of stations where the Chevalier group is the highest producing one is few.

CHEVALIER II (C. I. NO. 200)

Originated by the Svalof Plant-Breeding Association, Svalof, Sweden, Chevalier II (C. I. No. 200) was imported into the United States by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture. Several importations were made, the first of which was C. I. No. 200 (Seed and Plant Introduction No. 5473), received March 11, 1901. Another importation (S. P. I. No. 10584; C. I. No. 530) was made in 1904, and a third (S. P. I. No. 19781; C. I. No. 604) was made in 1907. These later numbers have been discarded in favor of C. I. No. 200. The original selection was made by Doctor Nilsson from Horsford Chevalier and was a pedigreed barley of the Chevalier type. It is about as dense as Charlottetown 80; in other words, more dense than the usual Chevalier. A spike of Chevalier II is shown in Plate I, A.

HORN (C. I. NO. 926)

Horn is a pedigreed selection from C. I. No. 31 of the same name, which originally came from Gassen, Austria. This selection, a 2-rowed bearded barley of the Chevalier group, was made by the United States Department of Agriculture in breeding experiments in cooperation with the Minnesota Agricultural Experiment Station at St. Paul, Minn. Small quantities of seed were sent from St. Paul to a number of places, where it was grown in nursery rows. At Archer, Wyo., it showed such promise that it was increased and included in the field plats. The yields on the larger area continued to be large, and seed was sent to a number of other stations for plat testing. While it has not been widely tested it has given high yields not only at Archer but also at Havre, Mont., where it produced the highest average yield of all varieties grown for the five years from 1917 to 1921, inclusive.

CHARLOTTETOWN 80 (C. I. NO. 2732)

Charlottetown 80 was selected from Old Island Two-Rowed by J. A. Clark, superintendent of the Experimental Farm, Charlottetown, Prince Edward Island, Canada.

The Old Island Two-Rowed is a variety that has been grown on Prince Edward Island for many years. It consists principally of Chevalier types but also contains a much taller barley with a dense spike. It was doubtless brought there from England. Mr. Clark selected one of the Chevalier types which had a tendency to drop the awns at maturity. While this barley belongs to the Chevalier group it would seem that some modification has occurred which favors its culture in areas south of those normally best suited to that group. In recent years it has given very good results not only at Charlottetown but at many of the stations in western Canada and in the United States. It is unquestionably one of the best Chevalier selections which have been made so far as its culture in America is concerned. Besides the tendency to drop the awns this selection often has more red on the nerves of the lemma just before maturity than is common with the Chevalier barleys.

PRINCESS (C. I. NO. 529)

Princess (C. I. No. 529) is a pedigreed variety originated by the Svalof Plant-Breeding Association, Svalof, Sweden. It was first imported into the United States by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture in April, 1904, under S. P. I. No. 10583. Several other importations of Princess were made under later numbers, but because it is a pedigreed variety these numbers have been discarded in favor of C. I. No. 529. It is a 2-rowed bearded barley. Like the Chevalier it requires a long growing season, but it is usually several days later in ripening than Chevalier. It has not proved a high-yielding sort in the United States.

HANNA (C. I. NO. 203)

Introduced into the United States by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture in January, 1901, from Kwassitz, Moravia, Austria, Hanna (C. I. No. 203) has been grown for many years in Germany and Austria for brewing purposes. It is a 2-rowed bearded barley with lax head like that of Chevalier. It is earlier than Chevalier and has a long-haired rachilla. While it has been widely tested at a number of experiment stations throughout the United States, it has not been outstanding in point of yield at any one of them. This type of barley seems best adapted to the New England States, New York, Pennsylvania, and western North Dakota. At the Cornell Agricultural Experiment Station several crosses have been made with Hanna which seem very promising.

GOLD (C. I. NO. 1145)

Produced by the Svalof Plant-Breeding Station of Svalof, Sweden, several importations of Gold (C. I. No. 1145) have been made both by the United States Department of Agriculture and by experiment stations in the United States and Canada. As it originated as a plant selection the various importations may be considered identical. Gold is a barley of the Hanna type. Its appearance is not at all striking. It was only after it had been tested for a number of years at the Svalof station that its yielding ability was sufficiently demonstrated to attract attention. This variety has been widely tested in the United States and Canada in recent years. It has been in the test only a few years at most places. In recent years it has produced high yields at Ottawa, Ontario, and Indian Head, Saskatchewan, but was inferior to Manchurian (C. I. No. 739) at Ottawa and to O. A. C. 21 (C. I. No. 1470) at Indian Head. It was not so good as Garton 68 (C. I. No. 2740), Hannchen (C. I. No. 531), or Manchurian (C. I. No. 739) at Brandon, Manitoba. In the United States Gold has been grown at a number of stations. It has shown promise over a wide range of territory but has not been outstanding at any place. At some points it has produced very high yields, but the number of years it has been in the tests has been too few to determine its value.

HANNCHEN (C. I. NO. 531)

Hannchen (C. I. No. 531) was introduced into the United States by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture in April, 1904. It was originated by the Svalof Plant-Breeding Association of Svalof, Sweden, and is a 2-rowed barley of the Hanna type. (Pl. I, B.) In 1921 at Aberdeen, Idaho, the average length of the internodes of 25 spikes was 3.4 millimeters.

Hannchen has given by far the best yields and has exhibited a much wider range than any of the other barleys imported from Svalof. Although coming from the very different climate of northern Europe it has proved to be of especial value in regions of low rainfall in the United States. In the past five years it has been among the best five varieties at 13 stations located between Eureka, S. Dak., and Burns, Oreg.

ALPHA (C. I. NO. 959)

Alpha (C. I. No. 959), shown in Plate I, C, is a 2-rowed selection from a cross of Manchuria × Champion of Vermont. It was produced in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. It was later tested and distributed by the agricultural experiment station at Cornell University, Ithaca, N. Y. It has produced high yields on the farms in New York State and its acreage is increasing.

WHITE SMYRNA (C. I. NO. 195)

Received by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture from Smyrna, Asia Minor, on November 15, 1901, White Smyrna (C. I. No. 195) is a 2-rowed bearded barley with an average density of 3.6 millimeters at Aberdeen, Idaho, in 1921. (Pl. I, E.) It has been widely tested at the experiment stations in the western half of the United States and is the most drought resistant of any of the varieties so far tested. The straw is very short, and the head when fully emerged usually remains about half inclosed in the boot. In point of yield it has done particularly well in sections of Montana, Wyoming, western South Dakota, northern Colorado, Idaho, and eastern Oregon.

White Smyrna (C. I. No. 910) is a selection of this variety which had done particularly well at Moccasin, Mont.

White Smyrna under numbers C. I. 195, 658, or 910 has been one of the five highest yielding varieties at 22 stations in the past five years. These cover an area from Eureka, S. Dak., to Chico, Calif., and from Havre, Mont., to Tribune, Kans.

WHITE SMYRNA (C. I. NO. 658)

White Smyrna (C. I. No. 658) differs only in a few minor details from White Smyrna (C. I. No. 195). It has been grown under the name "Ouchac," or "Ouchac Smyrna," at a number of the western stations. The most characteristic difference in the two White

Smyrna strains as grown at Aberdeen, Idaho, in 1921 was the longer straw length of C. I. No. 658. At Bozeman, Mont., Burns, Oreg., Dickinson, N. Dak., and Archer, Wyo., it has yielded well.

SIX-ROWED HULLED AWNED AND AWNLESS BARLEYS

MANCHURIA (C. I. NO. 244)

All the unpedigreed Manchuria barleys originally sent out from the Ontario Agricultural College, Guelph, Ontario, have been given the number C. I. 244. According to Ontario Agricultural College Bulletin No. 71, page 6, this barley, under the name "Mandscheuri," was "imported from Russia in 1881 and is probably the same as Mensury." The writers do not know the full history of this variety. It was grown and distributed under the name "Mandscheuri," which is German for Manchuria. Other variations of the spelling occurred later. It is not stated in the report whether the barley was imported direct from Russia or through Germany. All varieties tracing to Guelph have been kept separate from those tracing to Madison, Wis. It may be that it is from the same source and the same stock as C. I. No. 241. As both varieties are merely mixtures of an indefinite number of strains, their culture at Madison and Guelph would eventually result in a different residual complex, whether they were the same or different to start with. The variety resulting at Guelph seems to have been the better of the two for most of the Manchuria district.

In 1894 this variety was sent from Guelph, Ontario, to St. Paul, Minn., from which place it was received at Fargo, N. Dak. It was soon grown by many seedsmen and was rapidly distributed to the various experiment stations and farmers in the upper Mississippi Valley. At many of the stations it is still grown as Minnesota No. 32 or Minnesota No. 105. Its immediate origin is thought to be the humid plains of eastern Manchuria, though descendants from the same common stock doubtless spread to the plains of central Europe. In the United States its area of best adaptation is undoubtedly the humid States of the upper Mississippi Valley, where soil and climatic conditions are quite comparable to those of central Eurasia. Manchuria is a 6-rowed bearded variety with lax head and long straw. (Pl. II, A.) Since it is a mixture of a number of strains the aleurone layer may be either blue or white. This variety has been widely tested for many years in the United States. It has produced exceptionally high yields at St. Paul, Minn., and Fargo, N. Dak., and is the common barley grown commercially in these States. A number of selections have been made from C. I. No. 244 which have also been high yielders at the various stations.

MANCHURIA (C. I. NO. 241)

Manchuria (C. I. No. 241) was the first introduction of the Manchuria barley into the United States. About 1859 a traveler brought to Germany a sample of barley from the Amur River district of Manchuria. About 1861 Dr. Herman Grunow, of Mifflin, Iowa County, Wis., while on a visit to Germany, secured some of this seed, which he brought to America. The Wisconsin Agricultural Experiment Station received this barley from Doctor Grunow and grew it in 1872. For many years this was the best variety at the Wisconsin station. It was widely distributed to farmers in Wisconsin and at one time constituted a large part of the acreage of barley in that State. It is probable that there is much of the original "Manshury" stock or selections of it grown in Wisconsin and neighboring States. This Wisconsin Manchuria was sent to other stations and is the foundation of many selections made elsewhere. It proved to be generally better than the 6-rowed barleys from western Eurasia more commonly grown before its introduction. This variety was grown and distributed under various names and State numbers, such as Minnesota No. 6, North Dakota No. 787, Manshury, Mansury, and Manchuria.

MANCHURIA (C. I. NO. 2330)

Manchuria (C. I. No. 2330) is a selection made at the Minnesota Agricultural Experiment Station, where it is grown as Minnesota No. 184. This barley has been tested at comparatively few stations outside of Minnesota but produced high yields for the years it was grown at La Fayette, Ind. At all of the Minnesota stations where barley has been grown Manchuria (C. I. No. 2330) has been one of the best varieties. It seems to be a high-yielding Manchuria strain that is particularly well adapted to Minnesota conditions.

SILVER KING (C. I. NO. 890)

Silver King (C. I. No. 890) is a barley of the Manchuria type which has been widely distributed over the United States by the Wisconsin Agricultural Experiment Station. It has proved a high-yielding variety at many places. Numerous high-yielding selections of Silver King were made at Madison.

FEATHERSTON (C. I. NO. 1120)

Featherston (C. I. No. 1120) was first grown in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. It came from a head selection made on a farm near Red Wing, Minn. This barley belongs to the Manchuria group. Since 1913 it has been grown at the Cornell Agricultural Experiment Station at Ithaca, N. Y., where it has yielded exceptionally well. During these years its yield was 115.3 per cent of that of the weighted mean of all varieties. Featherston has been distributed from Ithaca to farmers and to other stations.

O. A. C. 21 (C. I. NO. 1470)

A selection of Manchuria (C. I. No. 244) made by Prof. C. A. Zavitz at the Ontario Agricultural College at Guelph, Ontario, proved to be of unusual merit and was given the number O. A. C, 21 (C. I. No. 1470). It is probably the best Manchuria selection tested in Canada. It has been grown at a number of points in the United States in recent years. The yields have not been relatively so high as in Canada, but the variety should be more thoroughly tested in the States. It produced the best yields at Indian Head, Saskatchewan, and yielded well at Lacombe and Rosthern.

WISCONSIN PEDIGREE (C. I. NO. 835)

Wisconsin Pedigree is a selection made from a barley of the Manchuria type at Madison, Wis. It has been distributed to a number of stations where it has given high yields.

MENSURY (C. I. NO. 2657)

A barley of the Manchuria group very widely tested at the Canadian stations under the name "Mensury" has been grown at a few stations in the United States under this name. The history of this variety is not clear. It may be that a Manchuria barley was received with this spelling, and it may differ a little in origin from C. I. Nos. 241 and 244, which were the common stocks of Manchuria barley found at American experiment stations. Mensury was among the highest yielding barleys at Nappan, Nova Scotia; Ottawa, Ontario; Brandon, Manitoba; and Fort Vermilion, Alberta, Canada. It was mostly grown in the earlier years. A selection from Mensury called Manchurian (C. I. No. 739) has been tested recently at many stations in the United States as well as in Canada.

MANCHURIAN (C.I. NO. 739)

Manchurian (C. I. No. 739) is a selection which was made from Canadian Mensury by Dr. C. E. Saunders, of Ottawa, Canada. It is a barley of the Manchuria type which has a blue color in the aleurone layer. It has been more widely tested in Canada than in the United States.

ODERBRUCKER (C. I. NO. 836)

Oderbrucker (C. I. No. 836) is a pedigreed selection of the Manchuria type made at the Wisconsin Agricultural Experiment Station. This barley has been widely distributed over the United States, giving high yields at many of the stations. While it has been promising over a wide area it is suited to the southern fringe of the Manchuria district relatively better than many other strains of that variety.

ODERBRUCKER (C. I. NO. 1529)

This variety is a pedigreed selection of Oderbrucker barley made at the Wisconsin Agricultural Experiment Station, where it was known as Wisconsin Pedigree No. 6. The Oderbrucker barley belongs to the Manchuria group and seems particularly well adapted to Wisconsin. This selection has produced very good results at Madison, Wis., and at La Fayette, Ind.

ODERBRUCKER (C. I. NO. 2700)

There were several independent introductions of the parent stock of the Oderbrucker variety into the United States and Canada. A reference in the report of the United States Department of Agriculture for 1865 (p. 28) states that this variety "is grown very extensively on the low, formerly swamp lands of the valley of the Oder, but which were drained during the reign of Frederick the Great and has since produced the very best barley known on the continent of Europe. It is a very favorite variety for the porter brewers of England and for which they pay a very high price. The sample experimented with, of this variety, was very small, and the season was too far advanced before it was received to test it properly. It, however, came up vigorously, and appears to be of robust growth, but had not time to mature."

In 1889 the Ontario Agricultural College at Guelph received this barley from Germany and later sent it to the Wisconsin Agricultural Experiment Station at Madison, where it was first tested in 1899 as Wisconsin No. 55. From Madison it was widely distributed, and it and later selections from it made by the Wisconsin station are the barleys commonly grown by the farmers of Wisconsin. In its appearance and general botanical description it closely resembles Manchuria. However, it is not so widely adapted to growing conditions of the northern Mississippi Valley as is Manchuria.

STELLA (C. I. NO. 2678)

Dr. C. E. Saunders produced a great many hybrid varieties of barley at Ottawa, Canada. These were distributed to the Dominion experiment farms for testing. Stella is one of the best of these hybrids. It is a selection from a cross of Swedish × Baxter. The Swedish parent was a 2-rowed barley received from Harris & Co., of London, England. Baxter is a 6-rowed selection with a peculiarly short kernel with thin glumes. The Stella hybrid looks much like a Manchuria barley and has a short-haired rachilla. This variety produced good yields at Charlottetown, Prince Edward Island; Nappan, Nova Scotia; Ottawa, Ontario; and Rosthern, Saskatchewan.

YALE (C. I. NO. 1592)

Yale is one of the barley hybrids which were produced by Dr. C. E. Saunders at Ottawa, Canada. It was a selection from a cross of Duckbill × Rennie Improved. The strain of Yale now being grown at Ottawa is a Manchuria type of barley with a short-haired rachilla. Yale was the best of the hybrid varieties tested at Brandon, Manitoba. At most places it was not the equal of Stella, but it is unquestionably among the better hybrid varieties produced by Doctor Saunders.

HYBRID (C. I. NO. 2935)

This barley is a 6-rowed smooth-awned hybrid selected from a cross of Lion × Manchuria. It was developed in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. This hybrid is of special interest, as very few smooth-awned barleys have produced high yields. At Waseca, Minn., it was one of the highest yielding sorts for the three years in which it was grown. It also gave good yields at Grand Rapids, Minn. It is hoped that it will be more widely tested in the Manchuria regions.

MINSTURDI (C. I. NO. 1556)

Minsturdi (C. I. No. 1556) was developed in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. It is a 6-rowed bearded hybrid variety selected from the cross South African × Manchuria. At Aberdeen, Idaho, in 1921 it had an average spike density of about 2.8 mm., which is considerably greater than that of the average Manchuria barley. In recent years it has been outstanding in yield at St. Paul, Grand Rapids, and Crookston, Minn.

ODESSA (C. I. NO. 182)

Odessa (C. I. No. 182) is a barley belonging to the same general group as Manchuria. Since it is adapted to conditions in southern Russia, one would expect the region of its best adaptation in the United States to be south and west of the section where Manchuria grows best. This is only partially true. Odessa has produced very high yields in South Dakota and seems particularly well adapted to culture in that State. On the other hand, it has done very well in the Canadian districts where Manchuria is also at its best. For many years Odessa was the best barley at Ottawa, Ontario. It gave good yields at Brandon, Manitoba, and Indian Head, Saskatchewan, but was not so good as Manchuria in Minnesota and North Dakota. Odessa contains several types, and numerous selections were made from it in the cooperative studies at St. Paul, Minn. Some of these have been grown in field plats in recent years. They are not of the same type as the barleys grown in Canada and North Dakota.

STAVROPOL (C. I. NO. 2103)

Stavropol (C. I. No. 2103) belongs to the same general group as the Coast barley and probably originated in southern Russia near the Caucasus Mountains. Being adapted to conditions of this region it is not surprising that this type of barley does well in the western half of Kansas and the southwestern part of Nebraska, where the altitude varies from 2,000 to 4,000 feet and the climatic conditions are comparable. It has produced exceptionally good yields at Hays and Colby, Kans. Stavropol is not so good as Trebi or Coast at North Platte, Nebr., but it is one of the types now grown extensively in western Kansas.

TREBI (C. I. NO. 936)

Trebi barley is a pure-line selection made in 1907 in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. The original importation was brought into the United States by the Office of Foreign Seed and Plant Introduction from Samsun, Asiatic Turkey, in 1905, being designated as S. P. I. No. 15821. Mr. Papathopoulos, from whom the seed was received, obtained it from Trebizond. This importation contained a number of strains, and several other selections were made. It is a 6-rowed bearded barley with heads very similar to those of Coast. At Aberdeen, Idaho, the plants are usually several days earlier and the straw is a little shorter than those of Coast. In threshing, the awns break off from the kernel more easily than those of the Coast variety.

At Aberdeen, Idaho (irrigated), Trebi has produced the highest average yield of any of the barleys grown. It also produced unusually high yields at Scottsbluff (irrigated) and North Platte, Nebr., Newlands, Nev. (irrigated), and Moro, Burns (irrigated), and Union, Oreg. On the dry lands Trebi has yielded well in years when there was a fair amount of rainfall, but it seems to be especially adapted to irrigated lands. On a farm near Aberdeen, Idaho, a field of 28 acres under irrigation produced a yield of more than 90 bushels to the acre. Trebi appears to do best under such climatic conditions as are found in southern Idaho.

Baker (C. I. No. 975), another selection from the same parent stock, has produced high yields at a few stations.

COAST (C. I. NO. 690)

Coast (C. I. No. 690) was selected for this discussion, but it includes the characteristics of Coast (C. I. No. 626), commonly grown in California. For many years it has been the most important of all varieties grown commercially in the western half of the United States. It has been known as Bay Brewing, Common, California Feed, and Blue. It is of North African origin. It is a 6-rowed bearded variety with short-haired rachilla (Pl. II, B). The head is lax but not so lax as that of Manchuria, and the straw is much shorter. The awns usually emerge earlier and are considerably heavier and rougher than those of Manchuria. The awns contain much less ash than those of Manchuria, which makes them less brittle. The tissues of the lemma are quite tender, and short pieces of awn are left on many kernels in threshing. Often where this occurs the lemma is torn for a short distance below the tip. Such kernels do not pack closely, and the bushel weight of Coast may be low even when the individual kernels are plump and heavy. Coast barley requires a semiarid climate and for that reason is particularly well adapted to the barley-growing sections of the Western States. It is the common feed grain of the West, and varying quantities are exported from California, where the production is far above the feed requirements. The better grades of this barley are in high favor with European brewers. This variety has been widely tested at the experiment stations throughout the West and has yielded exceptionally well at Burns, Oreg. (dry land), and (under C. I. No. 626) at Davis and Chico, Calif. Varieties of this type have been among the better sorts at many of the western stations.

COAST (CALIFORNIA NO. 4000, C. I. NO. 2821)

Coast (California No. 4000) barley is a pedigreed variety developed from Common (Coast) barley at Davis, Calif., about 12 years ago. Its general appearance is the same as that of Coast (C. I. No. 626). From Davis it has been widely distributed in the California barley districts. California No. 4000, according to Prof. G. W. Hendry, University Farm, Davis, Calif., is about 10 per cent more productive than the ordinary commercial Coast barley.

SANDREL (C. I. NO. 937)

Sandrel is a white 6-rowed hulled bearded selection from a bulk importation from Moravia. Since it is a barley of the Coast type, it was probably an accidental mixture. It differs from most of the North African selections in that the aleurone layer is white and not blue. At Archer, Wyo., Aberdeen, Idaho (irrigated), and Columbia, Mo., Sandrel produced very high yields.

BLUE LONG HEAD (C. I. NO. 2685)

The Blue Long Head variety has been widely tested at Canadian experiment farms. It is mentioned in the Canadian Experimental Farms Report of 1896 (p. 17). A specimen seen at Ottawa in 1922 indicated that Blue Long Head belongs to the Coast group of barleys. It is not quite typical of the Coast group, but is of importance in marking the limits of the ecological districts, since it was the only barley grown in Canada which belonged to the Coast group. It was one of the highest yielding varieties at Indian Head, Saskatchewan, while in eastern Canada it produced very low yields. Yields of Blue Long Head at points in the West other than Indian Head were not so high as might be expected.

PERUVIAN (C. I. NO. 935)

Peruvian (C. I. No. 935) is a pedigreed selection made in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. This barley also belongs to the Coast group, but it differs from Coast (C. I. No. 690) in several respects. At Aberdeen, Idaho, in 1921 it had a culm length of 97 cm., which was the longest of all the barleys of the Coast type. The spike, while more erect, was not so dense as Coast or Stavropol, the density being 3.7 mm. The seed length was 11.2 mm., the longest of all the barleys tested at Aberdeen in that year. The length of kernel is one of the conspicuous characters which differentiate it from Coast. Peruvian produced exceptionally high yields at Moro, Oreg., in the years in which it was tested.

BELDI GIANT (C. I. NO. 2777)

This barley undoubtedly belongs to the Coast group and is a variety of the Peruvian type. It was apparently substituted for the original Beldi (C. I. No. 190) at Davis, Calif., and distributed to the stations at Gooding, Aberdeen (Idaho), Bozeman (Mont.), Moccasin (Mont.), and Pullman (Wash.). At Pullman, Davis, and Aberdeen (irrigated) it was the second highest yielding spring barley for the years in which it was grown.

BELDI DWARF (C. I. NO. 190)

The Beldi Dwarf variety was first introduced into the United States from Algeria by the Office of Foreign Seed and Plant Introduction on September 26, 1901. It is a 6-rowed bearded barley with short straw. In Algeria it was grown on the saline soils in the vicinity of the Sahara Desert. It has been grown at most of the western stations, where its region of best adaptation would be expected. Although a good variety it has not proved to be superior at any of the stations where tested. It seems to have done best at Chico, Calif., where it ranked third in point of yield compared with the other varieties grown in the same years.

CALIFORNIA MARIOUT (C. I. NO. 1455)

The California Mariout barley, according to Prof. G. W. Hendry, of the California Agricultural Experiment Station, was secured from the E. Clements Horst Co., of San Francisco, from whose London office it had been obtained directly in 1905. This variety undoubtedly came from the dry-hill region west of Lake Mariout, Egypt, where many variations were found and brought to America in 1923 by the senior writer. Like Coast (C. I. No. 626) and Club Mariout (C. I. No. 261), this is a 6-rowed bearded barley which originated in northern Africa. It is easily distinguished from these types by its long-haired rachilla, shorter straw, etc.

In a comparison of the California and Club Mariout at Aberdeen, Idaho, in 1921 it was found that the awns of the former emerged three days earlier than those of the latter. The density of California Mariout was 3.7 mm., as compared with 2.6 mm. for Club Mariout. (Pl. II, C and D.) The straw length of the first was only 55 cm., as compared with 76 cm. for the second. Both in appearance and field requirements these barleys are quite different. The California Mariout is drought resistant, early, and well adapted to the warmer, drier interior areas of California. It will outyield the Coast barleys in these limited areas, but the Coast types remain by far the more important commercially.

CLUB MARIOUT (C. I. NO. 261)

Club Mariout (C. I. No. 261) was imported into the United States from Cairo, Egypt, by the Office of Foreign Seed and Plant Introduction, United States Department of Agriculture. In a letter from the Traders and Growers Union, Cairo, Egypt, March 3, 1919, it is stated that the Mariout barley comes from the district west of Alexandria, along the Mediterranean, where it was cultivated in Roman times. In 1923 the senior writer collected a large number of barleys in Egypt. From these samples it would appear that the Club Mariout came from east of the lake, while the California Mariout was cultivated on the dry hills to the west of it. Club Mariout is a 6-rowed bearded variety having straw of medium length and a short compact spike. At Aberdeen, Idaho, in 1921 the average density of Club Mariout was 2.6 mm. This variety is adapted in general to the same conditions as the Coast barleys. It is outstanding in yield at Chico, Calif., Moro, Oreg., and Hays, Kans. At these places it produced the highest average yield of all barleys grown for the five years from 1917 to 1921, inclusive. It is grown commercially in California, where the acreage is increasing, a large part of the crop being exported to Europe for brewing. There is also a limited acreage in Oregon. In most other localities in the West it is surpassed by the Coast varieties.

Club Mariout (C. I. No. 932) is a pedigreed selection of C. I. No. 261 made in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn.

FLYNN (C. I. NO. 1311)

Flynn (C. I. No. 1311) is a 6-rowed smooth-awned hybrid made in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. It came from a cross, Club Mariout × Lion, and was first tested in the nursery at Moro, Oreg., in 1917, where it was selected from several hybrids of the same cross because of its high yield and good appearance. Of the varieties grown in the field plats at Moro from 1918 to 1921, inclusive, Flynn was exceeded in yield only by Club Mariout and Peruvian. This barley is now being tested at a number of experiment stations where Club Mariout has done well. It now seems to be a very promising sort in these localities. The potential importance of this type of barley is great. The rough awns of the varieties now grown are objectionable, and if smooth-awned sorts which yield well can be produced they will be greatly preferred by farmers.

WINTER CLUB (C. I. NO. 592)

Winter Club (C. I. No. 592) is a bearded 6-rowed barley with a short compact head. (Pl. III, fig. 2, D.) It has been grown commercially for a number of years in Utah, usually under the name Utah Winter or White Winter. It is one of the oldest types of barley known, having been cultivated in western Europe before historical times. It is plausible that the dense 2-rowed barleys came from crosses of this 6-rowed and a lax 2-rowed sort. This variety does not have so pronounced a winter habit as most other winter barleys. At Burns, Oreg., it yielded very well when spring sown. At Pullman, Wash., it also produced fair yields as a spring barley. As a winter barley at Pullman it made the highest average yield of all varieties grown in the same years.

TENNESSEE WINTER (C. I. NO. 257)

Tennessee Winter (C. I. No. 257) is the dominant variety among the winter barleys. Its origin is not known. The parent stock has long been grown in Tennessee. Somewhat similar varieties have been received from Switzerland and the Balkans. It has been tested at a number of the experiment stations and is found to be the most frost resistant of all winter barleys. It is a 6-rowed bearded sort. While this barley seems particularly well adapted to the growing conditions of Tennessee, it has also produced high yields at Arlington Experiment Farm in Virginia, at Athens, Ga., and at State College, N. Mex. At Wooster, Ohio, and Blacksburg, Va., the highest yielding winter barleys were of the Tennessee Winter group.

ARLINGTON AWNLESS (C. I. NO. 702)

Arlington Awnless (C. I. No. 702) was developed by selection from a hybrid made between Tennessee Winter (C. I. No. 257) and Black Arabian (C. I. No. 202). This variety was originated by H. B. Derr, formerly of the Office of Cereal Investigations of the United States Department of Agriculture. It is a 6-rowed awnless hulled barley with a lax spike. Because of its earliness and awnless character it was thought it would become an important winter barley. The rachis, however, is very brittle, which causes much loss of grain by shattering. It is inferior to Nakano Wase (C. I. No. 754), another awnless variety. The latter is a Japanese barley which is quite winter hardy, but does not yield well enough to warrant extensive culture.

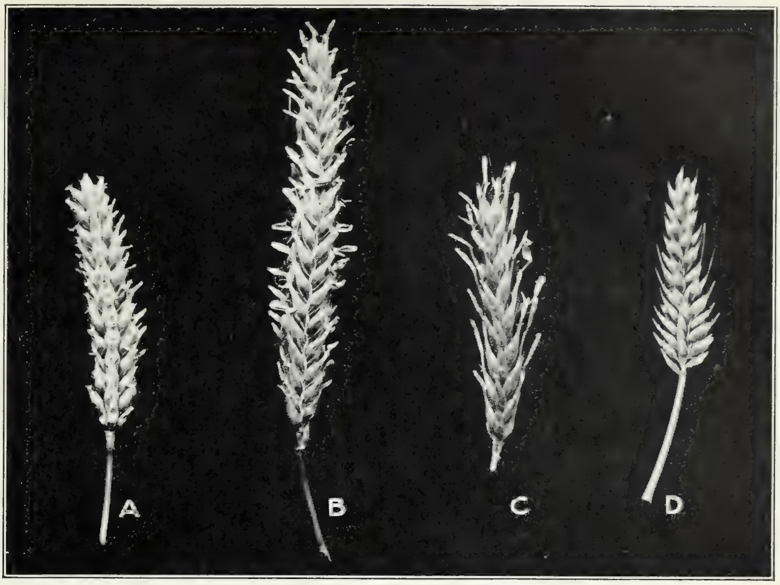


FIG. 1.—A, Nepal (C. I. No. 595), the original hooded variety, parent of all hooded forms, much inferior to hulled awned varieties except in a few mountain sections of the West; B, Horsford (C. I. No. 507), a variety of hybrid origin typical of those (usually Nepal) crossed on varieties of the Manchuria group; C, Meloy (C. I. No. 1176), a hooded hulled variety from Oregon, probably from a cross of Nepal on Coast, shattering less than Horsford; D, Nakano Wase (C. I. No. 754), an awnless winter form from Japan

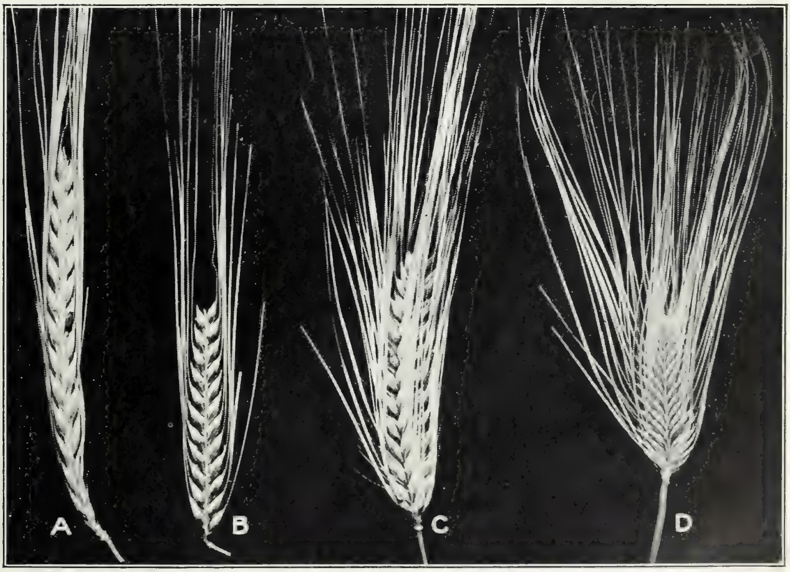


FIG. 2.—A, Baku (C. I. No. 709), a naked variety, common in dry mountain plateaus of southern Asia, not commercially important in America; B, Blackhull (C. I. No. 878), a deficient 2-rowed variety, promising in Colorado; C, Himalaya (C. I. No. 620), a naked variety from the same region as Baku, the best-yielding naked variety in America; D, Winter Club (C. I. No. 592), one of the old winter varieties once common in Europe, grown occasionally in the Great Basin

HEADS OF BARLEY VARIETIES.—II

SIX-ROWED HULLED HOODED BARLEYS

MELOY (C. I. NO. 1176)

The Meloy (C. I. No. 1176) barley is evidently a natural hybrid. It is a 6-rowed hooded hulled variety which was found in the field of George Meloy, Moro, Oreg. In general appearance it is like the ordinary Horsford except that the hoods are more elevated. (Pl. III, fig. 1, C.) At Aberdeen, Idaho, in 1921 Meloy had a culm length of 97 cm., as compared with 114 cm. for Horsford (C. I. No. 507). The average density was 3.3 mm., which was almost the same as that of Horsford. As the latter barley has been a low yielder in practically all localities, it is of interest to note that Meloy has produced very high yields at Moro, Oreg.

The Horsford varieties have all exhibited the defect of shattering badly. The awn of barley contains as high as 32 per cent of ash. When the awn is removed by crossing, the awnless hybrids of the progeny shatter easily, probably owing to an excess of ash in the rachis. The rachis of the Coast barleys contains much less ash than that of the Manchuria types, and it is probable that less ash is absorbed by the Coast plants. Crosses with Nepal on Coast should give hooded hybrids less brittle than when Nepal is crossed on Manchuria. Meloy is thought to have resulted from a hybrid of Nepal and Coast and shatters less than the progeny of Manchuria-Nepal crosses.

HORSFORD (C. I. NO. 507)

The Horsford variety was originated by F. H. Horsford, of Charlotte, Vt., for whom it was named. In 1879 or 1880 Mr. Horsford crossed a Nepal on a 6-rowed bearded hulled barley and obtained a 6-rowed hooded hulled variety which has proved constant for these characters. C. I. No. 507 (Pl. III, fig. 1, B), however, has been given to a number of the barleys of this description that are not selections or pedigreed strains of this type. A number of these undoubtedly did not come from Mr. Horsford's cross, but they are of the same general type, having been produced by crossing Nepal with barleys of the Manchuria type. This variety is grown extensively in the United States and has been tested at most of the experiment stations throughout the country. Like Nepal, however, it is a low-yielding sort, as compared with the better varieties of a region, and has the additional defect of shattering when ripe. It is grown commercially under such names as Beardless, Great Beardless, and Success. Although it is not hull-less, in general appearance it is quite like the Nepal barley, but the head is not so dense, the hoods are not usually so sessile, and the straw is longer. The beardless character of both of these barleys makes them desirable, because of the greater ease with which they may be handled. Nearly all seedsmen carry a Horsford barley under some commercial name, and farmers are led by their descriptions to grow these barleys in entirely unsuitable localities.

SIX-ROWED HULLED AWNED BLACK BARLEYS

LION (C. I. NO. 923)

Lion (C. I. No. 923) is a pedigreed selection from S. P. I. No. 32767 made in the cooperative breeding experiments conducted by the United States Department of Agriculture and the Minnesota Agricultural Experiment Station at St. Paul, Minn. The original barley from which this selection was made was first found at the agricultural experiment station in Taganrog, southern Russia. It was obtained from the experiment station near Rostov on Don through the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture, in December, 1911. Lion is a 6-rowed black smooth-awned variety. It has been used as one of the parents in a number of crosses in the hope of producing a high-yielding smooth-awned hybrid. While it has produced good yields at several of the experiment stations, it has no present commercial importance. At the Michigan Agricultural Experiment Station this barley was called Michigan Black Barbless and was distributed under that name. Apparently the Lion sent to the Michigan station from Minnesota had become mixed, as more than one type was selected at Michigan. It is the opinion of the writers that the strain finally chosen for distribution was identical with Lion, as they have been able to find no differences between the two.

GATAMI (C. I. NO. 575)

Gatami (C. I. No. 575) barley was imported into the United States from Mukden, Manchuria, by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture in April, 1907. At many of the experiment stations in earlier years it was grown under the Chinese name Gai ta mi or some variation of this spelling. It is a black-bearded 6-rowed barley having the same general growth requirements as Manchuria and Odessa. While it has been widely tested in the United States, it is usually surpassed in yield by Manchuria and Odessa when grown at the same stations. It is a very early variety, ripening several days before Manchuria or Odessa at most points. For this reason it has proved to be of value in localities in South Dakota where hot dry weather occurs early in the summer.

SIX-ROWED NAKED BARLEYS

NEPAL (C. I. NO. 595)

Nepal is one of the older types of barley grown in the United States. It is thought to have originated in Nepal, India, where it was first noticed by Europeans in 1839. The number C. I. No. 595 (Pl. III, fig. 1, A) has been given to most of the 6-rowed naked hooded barleys that are not selections or pedigreed strains. This variety has been tested at one period or another at nearly all the experiment stations in the United States. It has also been grown under many names at these stations, the more common ones being White Hull-less, Giant White Hull-less, Ideal Hull-less, and Colossal Hull-less. Because it has no awns and is hull-less it is not unpleasant to handle and is very easily threshed. These qualities make it a desirable type of barley. At none of the stations, however, has Nepal produced high yields. At most of them it was among the lowest in yield. Many crosses have been made with other types of barley with the hope of producing high-yielding hooded varieties, but with few exceptions these have not proved worthy of note. Crosses with barleys of the Manchuria type have resulted in progeny in which the rachis is so brittle that large losses occur from shattering.

HIMALAYA (C. I. NO. 620)

Several importations of barleys of the Himalaya type have been tested on experimental farms. Others have most likely been grown by farmers without having found their way to the stations. In all cases the type is quite similar. (Pl. III, fig. 2, C.) This blue naked 6-rowed bearded barley is quite common in central Asia and occurs at the higher altitudes in northern India. It has given higher yields than other naked sorts and is found in occasional fields throughout the barley-producing sections of the western mountain region of the United States.

BLACK HULL-LESS (C. I. NO. 596)

The Black Hull-less variety is widely distributed over central Asia. Its kernels when grown under semiarid conditions are brilliant purple at harvest time. As they dry, this purple darkens until the kernels are almost black in appearance. It is a 6-rowed bearded barley, like Himalaya, and has been tested and grown in the same general regions, but it has not proved to be the equal of that variety in yield.

ACCESSION DATA OF CEREAL INVESTIGATION NUMBERS

The barley varieties appearing in this bulletin have been accessioned under Cereal Investigations (C. I.) numbers. In a great many cases these varieties were received from foreign countries through the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture. In these cases the C. I. number is the one under which they were first grown by the Office of Cereal Investigations and distributed to the experiment stations. In many other cases the varieties were received from State experiment stations and accessioned. Many of the varieties have not been received by the department, especially those of Canadian stations. As they often were grown at several stations under different station numbers, it was necessary to accession these as well.

In Table 94 the data occurring under the Cereal Investigations numbers are abridged in tabular form. The list of station numbers and synonyms must necessarily be incomplete. An attempt is made to indicate the character of the barley by stating that it belongs in a certain group. Such grouping is necessarily approximate. For example, the Chevalier barleys merge into the Hanna types by way of the Bohemian group, which has some of the characters of each. There is some confusion as to whether certain varieties originated in Austria or Germany. Conditions in these countries are so similar, however, that it is immaterial which is credited as the place of origin.

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
3	Plumage	Sterile	Hulled	Awned	White		Dense	Thorpe	England	Various		Plumage from Norway.
17	Perm	do	do	do	do				Russia	Russia		
20	do	Fertile	do	do	do				do	do		
22	Nepal	do	Naked	Hooded	do			Nepal	India	New York		
23	Chevalier	Sterile	Hulled	Awned	do		Lax	Chevalier	England	Russia		
24	Hanna	do	do	do	do		do	Hanna	Germany	Various		
25	Saale	do	do	do	do		do	do	do	do		
26	Hanna	do	do	do	do		do	do	do	Austria		
27	Bohemian	do	do	do	do		do	do	Bohemia	do		
28	Hanna	do	do	do	do		do	do	Germany	do		
29	Bestehorn Imperial.	do	do	do	do		Dense	Thorpe		do		
30	Hanna	do	do	do	do		Lax	Hanna	Germany	do		
31	Horn	do	do	do	do		do	Chevalier	England	do		
32	Bohemian	do	do	do	do		do	Hanna	Bohemia	do		
33	Hanna	do	do	do	do		do	do	Germany	do		
34	do	do	do	do	do		do	do	Plant selection	do		
35	Chevalier	do	do	do	do		do	Chevalier	England	do		
36	Coreth	Fertile	Naked	do	do				Central Asia	Mexico		
39	Rokaku Chevalier.	Sterile	Hulled	do	do		Lax	Chevalier	England	Japan		
45	Mishima	Fertile	Naked	do	do				Japan	do		
46	Senbaku	Sterile	Hulled	do	do		Dense		do	do		
47	Striegum	do	do	do	do		Lax	Hanna	Germany	do		
48	Golden Melon	do	do	do	do		Dense	Thorpe	England	do		
49	Nita	Fertile	Naked	do	do				Japan	do		
50	Tanikaze	do	Hulled	do	do				do	do		
52	Santaku	do	do	do	do				do	do		
54	Shiro-Nishiki	do	do	do	do				do	do		
55	Tarumizu	do	Naked	do	do				do	do		
56	Uyetake	do	do	do	do				do	do		
60	Nijo	Sterile	do	do	do			Baku	do	do		
62	Doitsu	Fertile	Hulled	do	do				do	do		
64	Baitori	do	do	do	do				do	do		
78	Sangatsuka	do	Naked	do	do				do	do		
80	Mocki-Mugi	do	do	do	do				do	do		
84	Kostroma	Sterile	Hulled	do	do				Russia	Russia	North Dakota No. 327.	

89	Sisolsk	Fertile	do	do	do			Arctic	do	Various	North Dakota No. 326.	Sisolsk Spring.
90	Caucasian	do	do	do	do				do	Russia		
91	Altamura									Italy		
122	Probstier	Sterile	Hulled	Awned	White		Lax	Hanna	Germany	Various		
156	Chevalier	do	do	do	do		do	Chevalier	Plant selection	Coggeshall, England.	Minnesota No. 236.	King Chevalier.
157	Manhattan Malting.	do	do	do	do		do	do	England	Bozeman, Mont.		Chevalier.
158	Bavarian	do	do	do	do		do	Hanna	Germany	Germany		
159	do	do	do	do	do		do	do	do	do		
160	do	do	do	do	do		do	do	do	do		
162	Goldfoil	do	do	do	do		do	do	do	Austria		
165	Purposco	do	do	do	do				Russia	Russia		
167	Kitzing	do	do	do	do		Lax	Chevalier	England	Germany		
169	Prize Prolific	do	do	do	do		do	do	do	Canada		Carter's Prize Prolific.
170	Mensury	Fertile	do	do	do			Manchuria	Manchuria	do		
171	Surprise	do	do	do	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
172	Newton	Sterile	do	do	do			Thorpe	England	Canada		
173	Trooper	Fertile	do	do	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
174	Summit	do	do	do	do			do	do	do		
175	French Chevalier	Sterile	do	do	do		Lax	Chevalier	England	Various	North Dakota No. 254.	
176	Nugent	Fertile	do	do	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
177	Bolton	Sterile	do	do	do			do	do	do		
178	Sidney	do	do	do	do			do	do	do		
179	Victor	do	do	do	do			do	do	do		
180	Danish Chevalier	do	do	do	do		Lax	Chevalier	England	Canada		Chevalier.
181	Rennie Improved	Fertile	do	do	do			Manchuria	Manchuria	do		
182	Odessa	do	do	do	do			Odessa	Russia	do	North Dakota No. 255.	
183	Nepean	Sterile	do	do	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
184	Common	Fertile	do	do	do			Manchuria	Manchuria	Canada		Common Six-Rowed.
185	Baxter	do	do	do	do				Plant selection	Ontario, Canada		
186	Pilsen	Sterile	do	do	do		Lax	Hanna	Austria	Austria		
187	Svanhals (Pl. I, D).	do	do	do	do		Dense		Plant selection	Svalof, Sweden		
188	Bohemian	do	do	do	do		Lax	Bohemian	Bohemia	Austria		
189	Kitzing	do	do	do	do		do	Hanna	Germany	Germany		
190	Beldi Dwarf	Fertile	do	do	do				North Africa	Algeria		
191	Black Smyrna	Sterile	do	do	Black				Asia Minor	California		
192	Hankow	Fertile	do	do	White				Central Asia	China		
194	Telli	do	do	do	do			Coast	North Africa	Algeria		
195	White Smyrna (Pl. I, E).	Sterile	do	do	do		Lax	Smyrna	Asia Minor	Various	Minnesota No. 399.	
196	Tetcherit	Fertile	do	do	do				North Africa	Algeria		
197	Hankow	do	Naked	do	do				Central Asia	China		
198	Olonets	do	Hulled	do	do			Arctic	Russia	Russia		
199	Albacete	do	do	do	do			Coast	North Africa	Spain		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
200	Chevalier II (Pl. I, A).	Sterile	Hulled	Awned	White		Lax	Chevalier	Plant selection	Svalof, Sweden	North Dakota No. 1398.	
201	Kitzing	do	do	do	do		do	Hanna	Germany	Germany		
202	Black Arabian	do	do	do	Black				Asia Minor	Arabia		
203	Hanna	do	do	do	White		Lax	Hanna	Moravia	Various	North Dakota No. 649.	Moravian.
204	Bohemian	do	do	do	do		do	Bohemian	Bohemia	Austria		
205	Yenidje	Fertile	do	do	do				Asia Minor	Asia Minor		
206	Han River	do	do	do	do				China	Han River, China		
207	Frankish	Sterile	do	do	do		Lax	Hanna	Germany	Bavaria		Hanna, Lower Frankish.
208	Bavarian	do	do	do	do		do	do	do	do		Hanna.
209	Highland Chief	do	do	do	do		Dense	Thorpe	England	Various		
210	Baku	do	Naked	do	do			Baku	Central Asia	McPherson, Kans.		
212	Success	Fertile	Hulled	Hooded	do			Hybrid	Nepal ×	Utah		
213	Norway 8	do	do	Awned	do				Norway	Various		
216	Nerchinsk	do	Naked	do	do				Central Asia	Siberia		
220	Mammoth Winter.	do	Hulled	do	do			Tennessee Winter.	Europe	Russia		
221	Greece	do	do	do	do				Greece	Greece		
223	Argentine	do	do	do		Blue				Argentina		
230	Nepal	do	Naked	Hooded	White			Nepal	India	Iowa		Ideal Hull-less.
231	Ohio Beardless	do	Hulled	do	do			Hybrid	Nepal ×	Ohio		
234	Nepal	do	Naked	do	do			Nepal	India	Michigan		Colossal Hull-less.
235	Manchuria	do	Hulled	Awned	do			Manchuria	Manchuria	Massachusetts		Manshury.
237	do	do	do	do	do			do	do	Various		Mandscheuri.
240	do	do	do	do	do			do	do	Kansas		Manshury.
241	do	do	do	do	do			do	do	Various	Minnesota No. 6, Wisconsin No. 62, North Dakota No. 787.	Do.
244	Manchuria (Pl. II, A).	do	do	do	do			do			Minnesota Nos. 32 and 105, North Dakota No. 788.	Manshury, Mensury, Mandscheuri.
248	Bavarian	Sterile	do	do	do		Lax	Hanna	Germany	Bavaria		
252	Squarehead Winter.	Fertile	do	do	do				Europe	France		

253	Baku	Sterile	Naked	do	do			Baku	Central Asia	do		Two-Rowed Hull-less.
254	Himalaya	Fertile	do	do		Blue		Himalaya		do		Himalaya Hull-less.
255	Fan	Sterile	Hulled	do	White		Dense	Zeocriton	Asia	Various		Rice, Fächer, Peacock.
256	Black	Fertile	do	do	Black					France		
257	Tennessee Winter.	do	do	do	White			Tennessee Winter.	Europe	Various		Maryland Winter, Texas Winter.
259	Early Lapland	do	do	do	do			Arctic	Finland	France		
261	Club Mariout (Pl. II, C).	do	do	do	do			Club Mariout.	Egypt	Egypt		
262	Nepal	do	Naked	Hooded	do			Nepal	India	Colorado		Myer Hull-less.
263	Garton	do	Hulled	Awned	do				England	England		
264	do	do	do	do	do				do	do		
265	do	Sterile	do	do	do				do	do		
266	do	do	do	do	do		Dense	Thorpe	do	do	Minnesota No. 305.	
267	Chevalier	do	do	do	do		Lax	Chevalier	do	Bavaria		
268	Webs	do	do	do	do							
269	Frankish	do	do	do	do		Lax	Hanna	Germany	Bavaria		
270	Bohemian	do	do	do	do		do	Bohemian	Czechoslovakia	do		
271	Gold Medal	do	do	do	do		do	Hanna	Germany	do		
272	Kitzing	do	do	do	do		do	do	do	France		
274	Laniger	do	do	do	do		do	do	do	do		
275	Kwassitzer	do	do	do	do		do	do	do	do		
276	Coast	Fertile	do	do	do			Coast	Plant selection	U. S. D. A., Chico, Calif.		
277	Scottish Pearl	do	do	do	do			Tennessee Winter.	Europe	U. S. D. A., Arlington Farm, Va.		Tennessee Winter.
278	Chevalier	Sterile	do	do	do		Lax	Chevalier	England	France		
279	Fünfstettener	do	do	do	do		do	Hanna	Germany	do		
282	Frankish	do	do	do	do		do	do	do	do		
284	Bohemian	do	do	do	do		do	Bohemian	Czechoslovakia	do		
285	do	do	do	do	do		do	do	do	do		
287	Hanna	do	do	do	do		do	Hanna	Germany	do		
289	Imperial	do	do	do	do		Dense	Thorpe		do		
290	Chevalier	do	do	do	do		Lax	Chevalier	England	do		
293	Bohemian	do	do	do	do		do	Bohemian	Czechoslovakia	do		
295	Frankish	do	do	do	do		do	Hanna	Germany	do		
301	Hanna	do	do	do	do		do	do	do	do		
302	Laniger	do	do	do	do		do	do	do	do		
314	Poppenheim	do	Naked	do	do			Baku	Central Asia	do		
317	Prague	do	Hulled	do	do		Lax		Czechoslovakia	Czechoslovakia		
319	Hanna	do	do	do	do		do	Hanna	do	do	North Dakota No. 1326.	Austrian Hanna.
320	Crimean Hull-less.	do	Naked	do	do			Baku	Central Asia	Germany		Baku.
322	Himalaya	Fertile	do	do		Blue		Himalaya				
323	Victoria	Sterile	Hulled	do	White		Lax	Hanna	Germany	Germany		
324	Jewel	do	do	do	do		Dense	Thorpe	Western Europe	Various		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
325	Phoenix Von Thalen.	Sterile	Hulled	Awned	White		Lax		Germany	Various		
326	Cheyney	do	do	do	do		do	Hanna	do	Germany		
327	Goldthorpe	do	do	do	do		Dense	Thorpe	England	Canada		
328	Winter Six-Rowed.	Fertile	do	do	do					Maryland		
329	Manchuria	do	do	do	do			Manchuria	Manchuria	Germany		
330	Gambrinus	Sterile	do	do	do		Lax	Hanna	Germany	Various		
331	Bestehorn	do	do	do	do		do	Chevalier	England	Canada		
332	Kaiser	do	do	do	do		do	Hanna	Germany	Germany		
333	Baku	do	Naked	do	do			Baku	Central Asia	Canada		Large Two-Rowed Naked.
334	Trifurcate Hull-less.	do	do	Hooded	do			Hybrid	Nepal × Distichon	Germany		
335	Coeleste	Fertile	do	Awned	do				Central Asia	do		
336	Greek	do	Hulled	do	do				Greece	Various		
337	Black Winter	do	do	do	Black					Germany		Grecian Six-Rowed.
338	Hofbrau	Sterile	do	do	White		Lax	Hanna	Germany	Various		
339	Sholey Chevalier.	do	do	do	do		do	Chevalier	England	Germany		
341	Fan	do	do	do	do		Dense	Zeocriton	Asia	Various		Rice, Fächer, Peacock.
342	Italian	do	do	do	do		do	Thorpe	England	do		Italian Compact.
343	Moravian	do	do	do	do		Lax	Hanna	Czechoslovakia	Germany		
344	Bohemian	do	do	do	do		do	Bohemian	do	France		
346	Schwarzenberg I	do	do	do	do		do	Hanna	Germany	do		
348	Schwarzenberg III	do	do	do	do		do	do	do	do		
350	Voronezh	do	do	do	do		do		Russia	Russia		
351	Orel	do	do	do	do		do	Orel	Orel, Russia	do		
352	Nepal	Fertile	Naked	Hooded	do			Nepal	India	Washington		Mexican Beardless.
355	Abyssinia	do	do	Awned	do				Abyssinia	Abyssinia		
361	do	do	Hulled	do	do			Abyssinia	do	do		
368	Centre	Sterile	do	do	do		Lax	Hanna	Germany	France		
384	Brasserie	do	do	do	do				Hungary	Hungary		
408	Large-Grained Winter.	Fertile	do	do	do				Europe	Germany		
409	Goldthorpe	Sterile	do	do	do		Dense	Thorpe	England	St. Louis, Mo		
410	Mammoth Winter.	Fertile	do	do	do			Tennessee Winter.	Europe	Germany		

411	Golden Melon	Sterile	do	do	do		Lax	Chevalier	England	Various		
414	Bestehorn Giant	Fertile	do	do	do				Europe	Germany		
416	Hanna	Sterile	do	do	do		Lax	Hanna	Germany	do		
434	Catania	do	do	do	do		do			Sicily		
442	Aquila	Fertile	do	do	do					Italy		
455	Caveda	do	do	do	do					Portugal		
468	Quitepec	do	do	do	do				North Africa	Mexico		
488	Winter Club	do	do	do	do			Winter Club.	Europe	Lewiston, Idaho		White Winter.
507	Horsford (Pl. III, fig. 1, B).	do	do	Hooded	do			Hybrid	Nepal ×	Various	North Dakota Nos. 147, 378, and 720.	Success, Beardless.
516	Phoson	do	Naked	Awned	do				India	India		
518	Maryland Winter	do	Hulled	do	do			Tennessee Winter.	Europe	Maryland		Tennessee Winter.
519	Wisconsin Winter.	do	do	do	do			Wisconsin Winter.	do	Various		Bulgarian Winter.
521	Bulgarian	do	do	do	do			do	Bulgaria	Bulgaria		
528	Kashgar Hull-less	do	Naked	do	do				Asia	Kashgar		
529	Princess	Sterile	Hulled	do	do		Lax		Plant selection	Svalof, Sweden	North Dakota No. 1397.	
531	Hannchen	do	do	do	do		do	Hanna	do	do	Minnesota No. 150, North Dakota No. 1399.	
532	Primus	do	do	do	do		Dense	Thorpe	do	do	Minnesota No. 151, North Dakota No. 1400.	
533	Nepal	Fertile	Naked	Hooded	do			Nepal	India	Geneva, Idaho		Boehme's Hull-less.
534	Alaska	do	Hulled	Awned	do				Plant selection	Fairbanks, Alaska		
537	Oderbrucker	do	do	do	do			Manchuria	Manchuria	Madison, Wis		
539	Terwin	do	do	do	do			Tennessee Winter.	Europe	Channing, Tex		
549	Coast	do	do	do	do			Coast	North Africa	Utah		
554	Texas Winter	do	do	do	do			Tennessee Winter.	Europe	Texas		Tennessee Winter.
557	Cape	do	do	do	do				do	State College, Pa		
558	Golden Queen	do	do	do	do			Manchuria	Manchuria	Various	North Dakota Nos. 258 and 791.	Houston, Golden Queen.
559	Robertson	Sterile	do	do	do		Lax	Chevalier	England	Scotland		
575	Gatami	Fertile	do	do	Black				Manchuria	Manchuria	Minnesota No. 401.	
577	Kamamugi	do	Naked	do	White		Dense		Japan	Japan		
578	Tanbash	do	do	do	do				do	do		Tanbash Hull-less.
579	Wakamatsu	do	do	do	do				do	do		
583	Union Winter	do	Hulled	do	do			Tennessee Winter.	Europe	Knoxville, Tenn		
584	Standwell	Sterile	do	do	do		Dense	Hybrid	Fan × Golden Melon.	Garton Bros., England.		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
585	Maltster	Sterile	Hulled	Awned	White		Dense	Hybrid	(Jewel × Italian) × (Chevalier × Invincible).	Garton Bros., England.	Minnesota No. 364.	
586	Brewers Favorite.	do	do	do	do		do	Thorpe	England	do		
587	Kinver Chevalier	do	do	do	do		Lax	Chevalier	do	Various		
588	Golden Grain	do	do	do	do		do	do	do	do		New Golden Grains.
590	Invincible	do	do	do	do		Dense	Hybrid	(Chevalier × Golden Melon) × Standwell.	Garton Bros., England.		
592	Winter Club (Pl. III, fig. 2, D).	Fertile	do	do	do		do	Winter Club.	Europe	Various		Utah Winter, Tapp Winter, White Winter.
595	Nepal (Pl. III, fig. 1, A).	do	Naked	Hooded	do			Nepal	India	do	Minnesota No. 332, North Dakota Nos. 392 and 848.	Giant White Hull-less, White Hull-less.
596	Black Hull-less	do	do	Awned		Purple		Black Hull-less.	Central Asia	do	Wyoming No. 35	
606	Gutekorn	Sterile	Hulled	do	do		Lax		Plant selection	Svalof, Sweden	Minnesota No. 207.	
607	Sexradigt	Fertile	do	do	do				do	do	Minnesota No. 380.	Yatte Sexradigt.
610	Horsford	do	do	Hooded	do			Hybrid	Nepal ×	Dallas, Tex		Texas Beardless.
611	Blue Ribbon	do	do	Awned	do			Manchuria	Manchuria	Various	Minnesota No. 195.	
612	Chevalier	Sterile	do	do	do		Lax	Chevalier	England	Montana		
613	Manchuria	Fertile	do	do	do			Manchuria	Manchuria	do		
616	Famesh	Intermediate.	do	Awnless	do			Awnless	China	China		
617	Mansury	Sterile	do	Awned	do		Dense			Various	North Dakota No. 172.	
619	Himalaya	Fertile	Naked	do		Blue		Himalaya	Central Asia	do	Wyoming No. 46	
620	Himalaya (Pl. III, fig. 2, C).	do	do	do		do		do	do	do	Minnesota No. 204.	Guy Mayle.
626	Coast	do	Hulled	do	White			Coast	North Africa	do		California Feed, Bay Brewing.

629	Wyoming Hull-less	do	Naked	Hooded	do			Nepal	India	Bozeman, Mont.		
630	Nepal	do	do	do	do			do	do	do		Del Norte.
639	Beardless	do	Hulled	do	do			Hybrid	Nepal ×	Minneapolis, Minn		Horsford.
641	Silver Beardless	Sterile	do	do	do			do	do	Various	Minnesota No. 83.	Dakota Silver Beardless.
642	Salzer Beardless	Fertile	do	do	do			do	do	do		
643	Manchuria	do	do	Awned	do			Manchuria	Manchuria	do	Minnesota No. 105, C. I. No. 244.	
645	Garton 986	Sterile	do	do	do		Dense	Thorpe	England	Garton Bros., England.		
646	Tenkow	Fertile	do	do	do			Hybrid	Tennessee Winter × Hankow.	U. S. D. A., College Park, Md.		
647	Nesbian	Sterile	do	do	do		Lax	do	Tennessee Winter × Black Arabian.	do		
648	Virginia Hooded	Fertile	do	Hooded	do			do	Tennessee Winter × Horsford.	Various		
649	Hull-less	do	Naked	Awned	do				Asia	Nephi, Utah		
650	Coast	do	Hulled	do	do			Coast	North Africa	do		
651	California Prolific	do	do	do		Blue			do	do		
652	Poda	do	do	do		do		Coast	do	Peru		
653	Peru	do	do	do		do		do	do	do		
655	White Smyrna	Sterile	do	do	White		Lax	Smyrna	Asia Minor	California		Syrian Gaza.
658	do	do	do	do	do			do	do	San Francisco, Calif.		Ouchac.
659	Chile Chevalier	do	do	do	do		Lax	Chevalier	England	do		
660	Yerli	Fertile	do	do	do			Coast	Smyrna	Smyrna		
661	Benghazi	Sterile	do	do	do		Lax	Smyrna	Asia Minor	San Francisco, Calif.		
662	Tenarab	Fertile	do	do	do			Hybrid	Tennessee Winter × Black Arabian.	U. S. D. A., College Park, Md.		
663	Chile Common	do	do	do		Blue		Coast	North Africa	Chile		
664	Szechwan	do	Naked	do	White				Asia	Szechwan, China		
665	Tatien	do	do	do	do				do	Tatienlu, China		
669	Abyssinia	Deficient	Hulled	do	do			Abyssinia	Abyssinia	Abyssinia		
672	do	Mixed						do	do	do		
673	Abyssinian	do						do	do	do		
677	Heil Hanna 4	Sterile	Hulled	Awned	White		Lax	Hanna	Germany	Germany		
678	Heil Hanna 2	do	do	do	do		do	do	do	do		
679	Franconian	do	do	do	do		do	do	do	do		
680	do	do	do	do	do		do	do	do	do		
681	Heil Hanna 1	do	do	do	do		do	do	do	do		
682	Heil Hanna 3	do	do	do	do		do	do	do	do		
685	Kashmir	Fertile	Naked	do	do				India	Kashmir, India		
690	Coast (Pl. II, B)	do	Hulled	do	do			Coast	North Africa	Various		California Feed, Bay Brewing, Oregon.
691	Coast	do	do	do	do			do	do	do		
695	Barbary	do	do	do	do			do	do	Tripoli		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
702	Arlington Awnless.	Intermediate.	Hulled	Awnless.	White			Hybrid	Tennessee Winter × Black Arabian.	U. S. D. A. Arlington Farm, Va.		
703	Hansee Hull-less.	Fertile	Naked	Awned	do			do	Horsford × Hankow.	do		
704	Popeline	do	Hulled	do	Black				Caucasus	Caucasus		
705	Black Russian	do	do	do	do				do	do		
708	Black Algerian	do	do	Smooth awned.	do					Algeria		
709	Baku (Pl. III, fig. 2, A).	Sterile	Naked	Awned	White			Baku	Central Asia	Caucasia		
711	Turkestan	Fertile	Hulled	do	do				Turkestan	Turkestan		
712	do	do	do	do	do				do	do		
713	Canada Winter	do	do	do	do			Tennessee Winter.	Europe	Guelph, Ontario		
714	Caucasian	Sterile	do	do	do		Lax		Caucasia	Caucasia		
731	Pontius	Mixed							China	China		
735	Black Hull-less	Fertile	Naked	Awned		Purple			Central Asia	Chinese Turkestan.		
737	Niver											
739	Manchurian	Fertile	Hulled	Awned	White			Manchuria.	Plant selection	Ottawa, Canada	Minnesota No. 303.	
740	Canadian Thorpe	Sterile	do	do	do		Dense	Thorpe	England	do		
754	Nakano Wase (Pl. III, fig. 1, D).	Intermediate.	do	Awnless	do			Awnless	Japan	Japan		
835	Wisconsin Pedigree.	Fertile	do	Awned	do			Manchuria.	Manchuria	Wisconsin	North Dakota No. 2406.	Manchuria-Oderbrucker.
836	Oderbrucker	do	do	do	do			do	do	Various	North Dakota No. 2405.	Manchuria.
848	Scotch	do	do	do	do			do	do	do		
869	Kopeck	do	do	do	do			Coast	North Africa	Bolivia		
877	Horsford	do	do	Hooded	do			Hybrid	Nepal ×	Various		
878	Blackhull (Pl. III, fig. 2, B).	Deficient.	do	Awned	Black			Abyssinia.	Abyssinia	do		

881	Bernard	Fertile	do	do	White			Manchuria.	Manchuria	do	Minnesota No. 28, Wisconsin No. 63, North Dakota No. 789.	
882	Manchuria	do	do	do	do			do	do	do	North Dakota No. 966, Williston Nos. 61 and 170.	Common.
883	Highland Chief	Sterile	do	do	do		Dense	Thorpe	England	do	North Dakota No. 847, Williston No. 63.	
888	Oderbrucker	Fertile	do	do	do			Manchuria.	Manchuria	Minneapolis, Minn.	Williston No. 59.	
889	Reed Triumph	do	do	do	do			Hybrid	Highland Chief × Manchuria.	Various	Minnesota No. 361, Wisconsin No. 98.	Triumph.
890	Silver King	do	do	do	do			Manchuria.	Manchuria	do	Wisconsin No. 53, North Dakota No. 719, Minnesota No. 326.	Salzer's Silver King.
891	Success	Sterile	do	do	do					do	Williston No. 50, North Dakota No. 171.	
892	Evans	do	Naked	do	do			Baku	Central Asia	North Dakota	Williston No. 171, North Dakota No. 149.	McEvan, McEwan, Baku.
893	Proskowetz	do	Hulled	do	do		Lax	Hybrid	Czechoslovakia	Kassowitz (Austria).		
895	Cusado	Fertile	do	do	do			do	Tennessee Winter × Black Arabian.	U. S. D. A., College Park, Md.		
896	Arabel	do	do	do	do			do	do	do		
898	Omar	Sterile	do	do	do			do	do	do		
901	Pidor	Fertile	do	do	do			do	Tennessee Winter × Hankow.	do		
902	Valkow	do	do	do	do			do	do	do		
905	Silver King	do	do	do	do			Manchuria.	Plant selection	Madison, Wis	Wisconsin Pedigree 13.	Manchuria.
906	Hanna	Sterile	do	do	do		Lax	Hanna	do	U. S. D. A., St. Paul, Minn.	Minnesota No. 422.	
907	Steigum	do	do	do	do		do	do	do	do	Minnesota No. 424.	
908	Luth	Fertile	do	do	do			Manchuria.	do	do	Minnesota No. 421.	
909	Clyde	Sterile	Naked	do	do			Baku	Central Asia	Moccasin, Mont.		
910	White Smyrna	do	Hulled	do	do		Lax	Smyrna	Plant selection	U. S. D. A., Aberdeen, Idaho.		
911	Featherston	Fertile	do	do	do			Manchuria.	do	U. S. D. A., St. Paul, Minn.	Minnesota No. 423.	

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
912	Mahrische	Sterile	Hulled	Awned	White		Lax	Hanna	Plant selection	U. S. D. A., St. Paul, Minn.	Minnesota No. 427.	
913	Eagle	Fertile	do	do	do			Manchuria.	do	do	Minnesota No. 425.	
914	Italian	Sterile	do	do	do		Lax	Hanna	do	do		
915	Servian	Fertile	do	do	do				do	do	Minnesota No. 426.	
916	Odessa	do	do	do	do			Odessa	do	do		
917	Prentice	Sterile	do	do	do		Lax	Chevalier	England	Ottawa, Canada		Danish Prentice Chevalier.
918	Korsbyg	Fertile	do	do	do				Plant selection	Denmark	Wisconsin No. 97.	
920	White Gatami	do	do	do	do				do	U. S. D. A., Dickinson, N. Dak.		
921	Thorpe	Sterile	do	do	do		Dense	Thorpe		Moccasin, Mont.		
922	Bolton	do	do	do	do		do	Hybrid	Plant selection	U. S. D. A., St. Paul, Minn.		
923	Lion	Fertile	do	Smooth awned	Black				do	do	North Dakota No. 31001.	Michigan Black Barbless.
925	Australian White.	Sterile	do	Awned	White		Lax	Hanna	do	do		
926	Horn	do	do	do	do		do	Chevalier	do	do		
927	Odessa	Fertile	do	do	do			Odessa	do	do		
928	Goldfoil	Sterile	do	do	do		Lax	Hanna	do	do		
929	Summit	Fertile	do	do	do				do	do		
931	Steigum	Sterile	do	do	do		Lax	Hanna	do	do		
932	Club Mariout	Fertile	do	do	do			Club Mariout.	do	do		
933	Bohemian	Sterile	do	do	do		Lax	Hanna	do	do		
934	Odessa	Fertile	do	do	do			Odessa	do	do		
935	Peruvian	do	do	do		Blue		Coast	do	do		
936	Trebi	do	do	do		do			do	do		
937	Sandrel	do	do	do		do		Coast	do	do		
938	Abyssinian	Deficient	do	do	White			Deficiens	do	U. S. D. A., Chico, Calif.		
939	Palestine	Sterile	do	do	do				do	U. S. D. A., St. Paul, Minn.		
940	Oderbrucker	Fertile	do	do	do			Manchuria.	do	do		

941	Abyssinian									U. S. D. A., Chico, Calif.		
942	Hanna	Sterile	Hulled	Awned	White		Lax	Hanna	Plant selection	U. S. D. A., St. Paul, Minn.		
943	Abyssinian	Fertile	do	do	do			Abyssinia	do	U. S. D. A., Chico, Calif.		
946	do	do	do	do	do			do	do	U. S. D. A., St. Paul, Minn.		
950	do	do	do	do	do			do	do	U. S. D. A., Chico, Calif.		
952	Holland	Sterile	do	do	do		Lax	Hanna	do	U. S. D. A., St. Paul, Minn.		
953	Frankish	do	do	do	do		do	do	do	do		
954	Featherston	Fertile	do	do	do			Manchuria.	do	do		
956	Manchuria	do	do	do	do			do	do	do		
957	Oderbrucker	do	do	do	do			do	do	do		
958	Golden Melon	Sterile	do	do	do		Dense	Thorpe	Japan	Japan		
959	Alpha (Pl. I, C)	do	do	do	do			Hybrid	Manchuria × Champion of Vermont.	U. S. D. A., St. Paul, Minn.		
962	Scholey	do	do	do	do		Lax	Chevalier	Plant selection	do		
972	Luth	Fertile	do	do	do			Manchuria.	do	do		
973	Red River	do	do	do	do			do	do	do		
975	Baker	do	do	do		Blue		Trebi	do	do		
976	Cortney	do	do	do	White			Hybrid	6-row × 2-row	St. Paul, Minn		
977	White Moravian	Sterile	do	do	do		Lax	Hanna	Plant selection	U. S. D. A., St. Paul, Minn.		
982	Hodge	Fertile	do	do	do				Turkestan	Mexico		Mexican.
986	Woodrow	do	do	do	do				Russia	Russia		
994	Petro											
996	Rasput	Fertile	Hulled	Awned	White				Russia	Russia		
1030	Gisborne	Sterile	do	do	do		Lax	Hanna		Australia	Minnesota No. 362.	
1106	Black Hull-less	Fertile	Naked	do		Purple			Central Asia	Chinese Turkestan	Minnesota No. 402.	
1107	Cartouch	do	Hulled	do		Blue			Europe	Switzerland		
1116	Tartar	do	do	do	White			Trebi	Plant selection	U. S. D. A., St. Paul, Minn.		
1117	Khayyam	Sterile	do	do	do			Hybrid	Tennessee Winter × Black Arabian.	U. S. D. A., Rosslyn, Va.		
1118	Featherston	Fertile	do	do	do			Manchuria.	Plant selection	U. S. D. A., St. Paul, Minn.		
1119	do	do	do	do	do			do	do	do		
1120	do	do	do	do	do			do	do	do		
1121	Hanchamont	Sterile	do	do	do			Hybrid	Hanna × Champion of Vermont.	do		
1122	Hanna	do	do	do	do		Lax	Hanna	Plant selection	do		
1123	Cortile	Fertile	do	do	do			Hybrid	6-row smooth × 2-row Indian Head.	do		

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C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
1125	Manchuria	Fertile	Hulled	Awned	White			Manchuria.	Plant selection	U. S. D. A. St. Paul, Minn.		
1129	Malting	do	do	do	do				do	do		
1142	Chevalier	Sterile	do	do	do		Lax	Chevalier	England	Newell, S. Dak		
1144	Mahan	do	do	do	do		do			North Dakota		
1145	Gold	do	do	do	do		do	Hanna	Plant selection	Svalof, Sweden	Minnesota No. 435.	
1146	Oderbrucker	Fertile	do	do	do			Manchuria.	Manchuria	Various	Wisconsin No. 6.	
1147	Composite							Hybrid	Mixture of hybrids.	U. S. D. A., St. Paul, Minn.	Minnesota No. 400.	
1170	Chevalier	Sterile	Hulled	Awned	White		Lax	Chevalier	England	New Zealand	Minnesota No. 366.	Chevalier Prolific.
1174	Oderbrucker	Fertile	do	do	do			Manchuria.	Manchuria	Various	Wisconsin No. 6, South Dakota No. 178.	
1176	Meloy (Pl. III, fig. 1, C).	do	do	Hooded	do			Hybrid	Nepal ×	Moro, Oreg		
1177	Wing Pedigree	do	do	do	do			do	do	Chas. B. Wing, Ohio.	Colorado No. 30, North Dakota No. 3101.	Horsford.
1178	Manchuria	do	do	Awned	do			Manchuria.	Plant selection	U. S. D. A., St. Paul, Minn.		
1179	Algerian	do	do	do	do			Coast	do	do		
1189	Manchuria	do	do	do	do			Manchuria	do	do	Minnesota No. 1–16–66.	Mensury.
1211	Samofa	do	do	do	do			Hybrid	South African × Manchuria.	do	Minnesota No. 11–16–77.	
1236	Abyssinian	Deficient	do	do	do			Abyssinia	Plant selection	U. S. D. A., Chico, Calif.		
1246	Black Egyptian	Sterile	do	do	Black		Lax		Egypt	Various		
1247	Blue	Fertile	do	do		Blue		Coast	North Africa	do	Washington No. 973.	
1248	Excelsior	do	Naked	do		Purple			Central Asia	Pullman, Wash	Washington No. 959	Black Hull-less.
1249	Coast	do	Hulled	do	White			Coast	North Africa	Various	Washington No. 970.	California.
1250	Eureka	do	Naked	Hooded	do			Nepal	India	do	Washington No. 958.	

1252	Royal	do	Hulled	Awned	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
1256	Arequipa	do	do	do		Blue		Coast	North Africa	Peru		
1263	Fleche	do	do	do	White				South Russia	Crimea		
1269	Sagina	do	do	do	do			Coast	North Africa	Sudan		
1271	Horsford	do	do	Hooded	do			Hybrid	Nepal ×	Chas. B. Wing, Ohio.	Colorado No. 32, North Dakota No. 3102.	Wing's Ordinary.
1272	Oderbrucker	do	do	Awned	do			Manchuria	Plant selection	Madison, Wis	Wisconsin Pedigree 5.	
1273	do	do	do	do	do			do	do	do	Wisconsin Pedigree 7.	Manchuria.
1274	do	do	do	do	do			do	do	do	Wisconsin Pedigree 8.	Do.
1275	Manchuria	do	do	do	do			do	do	do	Wisconsin Pedigree 9.	Manshury.
1276	Silver King	do	do	do	do			do	do	do	Wisconsin Pedigree 14.	Manchuria.
1286	Hero	do	do	Smooth awned.	do			Hybrid	Club Mariout × Lion.	U. S. D. A., St. Paul, Minn.		
1303	Blarney	do	do	do	do			do	Lion × Manchuria	do		
1304	Hurst	do	do	do	do			do	Featherston × Lion.	do		
1308	Louden	do	do	do	do			do	Bay Brewing × Lion.			
1310	Erfurt White	Sterile	do	Awned	do		Lax	Hanna	Germany	Various		
1311	Flynn	Fertile	do	do	do			Smooth-awned hybrid.	Club Mariout × Lion.	U. S. D. A., Moro, Oreg.		
1312	Himalaya	do	Naked	do		Blue		do	Coeleste × Coast	Lompoc, Calif		Zvolanek.
1389	Abed	Sterile	Hulled	do	White					Moscow, Idaho		
1455	California Mariout (Pl. II, D).	Fertile	do	do	do			California Mariout.	North Africa	Davis, Calif		
1470	O. A. C. 21	do	do	do	do			Manchuria	Plant selection	Guelph, Ontario	Kansas No. 7119	Manchuria.
1472	Manchuria	do	do	do	do			do	do	Manhattan, Kans	Kansas No. 8019	Mansury.
1473	do	do	do	do	do			do	Manchuria	do	Kansas No. 7010	Do.
1474	Horsford	do	do	Hooded	do			Hybrid	Nepal ×	do	Kansas No. 8035	
1478	Manchuria	do	do	Awned	do			Manchuria	Plant selection	St. Paul, Minn	Minnesota No. 1-15-2.	
1511	Golden Queen	do	do	do	do			do	do	Madison, Wis	Wisconsin Pedigree 1.	Manchuria.
1517	Oderbrucker	do	do	do	do			do	Manchuria	Lincoln, Nebr		
1526	do	do	do	do	do			do	Plant selection	Ithaca, N. Y		
1529	do	do	do	do	do			do	do	Madison, Wis	Wisconsin Pedigree 6.	Oderbrucker-Manchuria.
1551	Albert	do	do	do	do			Hybrid	4-rowed × Canadian Thorpe.	Ottawa, Canada		
1554	Hanna	Sterile	do	do	do		Lax	Hanna	Germany	Ithaca, N. Y		Mensury.
1556	Minsturdi	Fertile	do	do	do			Hybrid	South African × Manchuria.	U. S. D. A., St. Paul, Minn.	Minnesota No. 439.	
1557	Claude	do	do	do	do			Hybrid	Duckbill × Common.	Ottawa, Canada		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
1562	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Manchuria	Various		
1563	July	do	do	do	do				Plant selection	Sweden		
1576	Early Indian	do	do	do	do				India	Canada		
1577	Aker	do	do	do	do			Manchuria	Russia	St. Paul, Minn.	Minnesota No. 442.	
1580	Manchuria	do	do	do	do			do	Manchuria	Lincoln, Nebr.		Common six-row.
1585	Himalaya	do	Naked	do		Blue		Himalaya	Central Asia	Manhattan, Kans.	Kansas No. 7128.	Abyssinian.
1592	Yale	do	Hulled	do	White			Hybrid	Duckbill × Rennie Improved.	Ottawa, Canada		
1701	Swedish Star	do	do	do	do		Dense		Sweden	Canada		Star.
1707	Tapp Winter	do	do	do	do		do	Winter Club.	Europe	Sidney, British Columbia.		Utah Winter, Winter Club, White Winter.
1775	Horsford	do	do	Hooded	do			Hybrid	Nepal ×	Pullman, Wash.	Washington No. 873.	
1778	do	do	do	do	do			do	do	Manhattan, Kans.	Kansas No. 7023.	
1797	Beardless	do	do	do	do			do	Nepal × Coast	Various		
1800	Bonanza	do	do	Awned	do			Manchuria	Manchuria	Kansas	Kansas No. 7025.	
1807	Horsford	do	do	Hooded	do			Hybrid	Nepal ×	do	Kansas No. 7020.	Horsford.
1808	Success Beardless	do	do	do	do			do	do	Indiana		
1853	Ace	Sterile	do	Awned	do		Lax	Smyrna	Plant selection	U. S. D. A., Highmore, S. Dak.		
1854	Hanna	do	do	do	do		do	Hanna	Germany	Ithaca, N. Y.		Two-rowed.
1877	White Moravian	do	do	do	do		do	Chevalier	England	Moscow, Idaho	Puyallup No. 61.	
1884	Saul	do	do	do	do		do	Hanna	Germany	Ithaca, N. Y.		
1886	Chevalier	do	do	do	do		do	Chevalier	England	Various		
1892	Champion of Vermont.	do	do	do	do		do	Hanna	Germany	do	North Dakota Nos. 169 and 253.	
1894	Wisconsin Winter.	Fertile	do	do	do			Wisconsin Winter.	Europe	Pullman, Wash.	Washington No. 971.	Chevalier Winter.
1907	Svansota	Sterile	do	do	do			Hybrid	No. 456 × Svanhals	U. S. D. A., St. Paul, Minn.	Minnesota Nos. 11-16-37 and 440.	
1909	Binder	do	do	do	do		Lax	Chevalier	England	Canada		
1910	Clifford	do	do	do	do					do		
1915	Beaver	do	do	do	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
1916	Duckbill	do	do	do	do		Dense	Thorpe	England	Various		
1928	Jet	do	Naked	do	Black			Jet	Abyssinia	Manhattan, Kans.	Kansas No. 7129.	

1934	Himalaya	Fertile	do	do		Blue		Himalaya	South-central Asia.	Various		Guy Mayle.
2033	Ohio Winter	do	Hulled	do	White			Tennessee Winter.	Europe	Ohio		Tennessee Winter.
2036	Michigan Winter	do	do	do	do			do	do	Indiana		
2039	Indiana Winter	do	do	do	do			do	do	do		Do.
2080	White Smyrna	Sterile	do	do	do		Lax	Smyrna	Plant selection	U. S. D. A., Akron, Colo.		Ouchac.
2087	Blackhull	Deficient	do	do	Black				do	do		
2103	Stavropol	Fertile	do	do	White			Coast	South Russia	Various		
2107	Ellis	do	do	do	do			do	North Africa	Hays, Kans		
2126	McClymont	do	do	do	do				Russia	North Platte, Nebr.		
2135	Golden Drop	Sterile	do	do	do		Lax	Chevalier	England	Various		
2147	Wing Beardless	Fertile	do	Hooded	do			Hybrid	Nepal ×	Moscow, Idaho		
2154	Odessa	do	do	Awned	do			Odessa	Plant selection	South Dakota		
2155	Manchuria	do	do	do	do			Manchuria	do	do		
2156	do	do	do	do	do			do	do	do		
2157	do	do	do	do	do			do	do	do		
2158	Odessa	do	do	do	do			Odessa	do	do		
2159	Wisconsin Winter.	do	do	do	do				do	U. S. D. A., Rosslyn, Va.		
2160	Arlington Awnless.	Intermediate.	do	Awnless	do			Hybrid	Tennessee Winter × Black Arabian.	do		
2161	do	do	do	do	do			do	do	do		
2162	do	do	do	do	do			do	do	do		
2163	Han River	Fertile	do	Awned	do				Plant selection	do		
2164	Nakano Wase	Intermediate.	do	Awnless	do				do	do		
2165	do	do	do	do	do				do	do		
2166	do	do	do	do	do				do	do		
2167	Wisconsin Winter.	Fertile	do	Awned	do				do	do		
2168	Odessa	do	do	do	do			Odessa	do	Highmore, S. Dak	South Dakota No. 232.	
2169	White Smyrna	Sterile	do	do	do		Lax	Smyrna	do	do		
2170	do	do	do	do	do		do	do	do	do		
2171	do	do	do	do	do		do	do	do	do		
2172	do	do	do	do	do		do	do	do	do		
2178	Chevalier	do	do	do	do		Lax	Chevalier	England	Manhattan, Kans	Kansas No. 7115	
2181	Manchuria	Fertile	do	do	do			Manchuria	Plant selection	do	Kansas No. 8025	
2182	do	do	do	do	do			do	do	do	Kansas No. 8029	
2183	Success	do	do	Hooded	do			Hybrid	Nepal ×	do	Kansas No. 8034	
2184	Oderbrucker	do	do	Awned	do			Manchuria	Manchuria	Hays, Kans		
2185	Austrian									do		
2186	Chile Common	Fertile	Hulled	Awned	White			Coast	Plant selection	Akron, Colo		
2187	Odessa	do	do	do	do			Odessa	do	do		
2189	Yenidje	do	do	do	do				do	do		
2190	Orel	Sterile	do	do	do		Lax		do	do		
2191	Oderbrucker	Fertile	do	do	do			Manchuria	Manchuria	do		
2198	Union	do	Naked	Hooded	do			Hybrid	Horsford × Black Hull-less.	Union, Oreg		
2199	do	do	do	do	do			do	do	do		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
2235	Coast	Fertile	Hulled	Awned	White			Coast	Plant selection	Davis, Calif.		California Centgener No. 3318.
2241	Mansfield	do	do	do	do			Hybrid	Duckbill × Rennie Improved.	Ottawa, Canada		
2295	Bevede	do	Naked	Hooded	do			do		Moro, Oreg		
2296	Black Algerian	do	Hulled	Smooth awned.	Black			Lion	Plant selection	U. S. D. A., Moro, Oreg.		
2297	Chile Brewing	do	do	Awned		Blue		Coast	do	do	Moro No. 708-1	
2298	Himalaya	do	Naked	do		do		Himalaya	do	do	Moro No. 657-1	
2299	do	do	do	do		do		do	do	do		Guy Mayle.
2300	Black Abyssinian	do	Hulled	do	White				do	do		
2301	Coast	do	do	do	do			Coast	do	do		
2302	Peru	do	do	do	do			do	do	do		
2303	Withycombe	do	Naked	Hooded	do			Hybrid		Union, Oreg		Withycombe Hull-less.
2304	Dufur	do	Hulled	Awned	do			Tennessee Winter.	Europe	Moro, Oreg		Tennessee Winter.
2305	Coast	do	do	do	do			Coast	North Africa	Burns, Oreg		
2306	do	do	do	do	do			do	Plant selection	U. S. D. A., Chico, Calif.		
2307	do	do	do	do	do			do	do	do		
2308	Abina	do	Naked	do	do				do	do		
2309	Hanna	Sterile	Hulled	do	do		Lax	Hanna	do	do		
2311	Peru	Fertile	do	do	do			Coast	do	do		
2312	Coast	do	do	do	do			do	do	do		
2313	Abyssinian								do	do		
2314	do								do	do		
2315	Nepal	Fertile	Naked	Hooded	White			Nepal	do	do		
2316	Hanna	Sterile	Hulled	Awned	do		Lax	Hanna	do	do		
2330	Manchuria	Fertile	do	do	do			Manchuria	do	St. Paul, Minn	Minnesota No. 184.	Improved Manchuria.
2617	do	do	do	do	do			do	Manchuria	Various		
2635	Canadian	do	do	do	do			do		Ithaca, N. Y		
2636	Hybrid	Sterile	do	do	do		Lax	Hybrid	Proskowetz × Frankish.	do		
2637	do							do	Eagle × Steigum	do		
2638	Manchuria	Fertile	Hulled	Awned	White			do	Manchuria × Featherston.	do		

2639	Selection	do	do	do	do					do	Cornell No. 103-53.	
2640	do	do	do	do	do					do	Cornell No. 103-28.	
2641	Portuguese	do	do	do	do			Coast	North Africa	Davis, Calif		
2642	Smyrna	Sterile	do	do	do		Lax	Smyrna	Asia Minor	Akron, Colo		
2644	Kent	Fertile	do	do	do			Coast	North Africa	Fallon, Nev		
2645	Saale	Sterile	do	do	do		Lax	Hanna	Germany	Canada		
2646	Beardless	do	do	do	do		do	Chevalier	England	do		
2647	Peerless White	do	do	do	do		do	do	do	do		
2649	California Prolific	do	do	do	do		Dense	Thorpe	do	do		
2650	Sharpe Chevalier	do	do	do	do		Lax	Chevalier	do	do		Improved Chevalier.
2651	Chevalier	do	do	do	do		do	do	do	do		
2652	Thanet	do	do	do	do		do	do	do	do		Improved Thanet.
2653	Polar	Fertile	do	do	do			Arctic	Russia	do		
2654	English Malting	Sterile	do	do	do		Lax	Chevalier	England	do		
2655	Swedish	do	do	do	do		do	do	do	do		
2656	New Zealand	do	do	do	do		do	do	do	Various	Washington No. 1066, C. I. No. 1846.	Chevalier.
2657	Mensury	Fertile	do	do	do			Manchuria	Manchuria	Canada	Minnesota No. 327.	
2658	Petschora	do	do	do	do			Arctic	Russia	do		
2660	Prince Edward	Sterile	do	do	do		Lax	Chevalier	England	do		
2661	Early Minting	do	do	do	do		do	do	do	do		
2662	Selected Chevalier.	do	do	do	do		do	do	do	Ottawa, Canada		
2663	Peerless	do	do	do	do					Canada		
2664	Spiti Valley	Fertile	Naked	do		Blue		Himalaya	India	do		Indian.
2665	Vanguard	do	Hulled	do	White			Hybrid	Swedish × Baxter	Ottawa, Canada		
2666	Peacock	Sterile	do	do	do		Dense	Thorpe	England	Canada		
2667	Pacer	do	do	do	do			Hybrid	Swedish × Baxter	Ottawa, Canada		
2668	Logan	do	do	do	do			do	Baxter × Duckbill	do		
2669	Leslie	do	do	do	do			do	Rennie Improved × Duckbill.	do		
2670	Dunham	do	do	do	do			do	Duckbill × Rennie Improved.	do		
2671	Kirby	do	do	do	do			do	Rennie Improved × Duckbill.	do		
2672	Jarvis	do	do	do	do		Lax	do	4-Rowed × Canadian Thorpe.	do		
2673	Garfield	Fertile	do	do	do			do	Duckbill × Baxter	do		
2674	Gordon	Sterile	do	do	do		Dense	do	Baxter × Duckbill	do		
2675	Harvey	do	do	do	do			do	Rennie Improved × Duckbill.			
2676	Phoenix	Fertile	do	do	do			do	Baxter × 2-Rowed	Ottawa, Canada		
2677	Pioneer	do	do	do	do			do	Swedish × Baxter	do		
2678	Stella	do	do	do	do			do	do	do		
2679	Brome	do	do	do	do			do	Rennie Improved × Duckbill.	do		
2680	Empire	do	do	do	do			do	do	do		
2681	Argyle	do	do	do	do			do	Baxter × Duckbill	do		

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
2682	Rigid	Sterile	Hulled	Awned	White					Canada		
2683	Champion	Fertile	do	Hooded	do			Hybrid	Nepal ×	do		
2684	Excelsior	do	do	do	do			do	do	do		
2685	Blue Long Head	do	do	Awned		Blue		Coast	Africa	do		
2686	Blue Short Head	do	do	do		do		Winter Club.		do		
2687	Dutch	Sterile	do	do	White							
2688	Warren	do	do	do	do			Hybrid	Baxter × Duckbill	Ottawa, Canada		
2689	Kangra Valley	Fertile	do	do	do				India	Canada		
2690	Lahoul	do	Naked	do		Blue		Himalaya	Himalaya	do		
2691	Palampur	do	Hulled	do	White				India	do		
2692	Simla	do	do	do	do				do	do		
2693	Seoraj	do	do	do	do				do	do		
2694	Kulu	do	do	do	do				do	Various	Wisconsin No. 57	Kumma Kulla.
2695	Sialkot	do	do	do	do				do	Canada		
2696	Mardan	do	do	do	do				do	do		
2697	Moultan	do	do	do	do				do	do		
2698	Bhagarmany Hills	do	Naked	do	do				do	do		
2699	Norway House	do	Hulled	do	do				Norway	do		
2700	Oderbrucker	do	do	do	do			Manchuria	Manchuria	Various	Wisconsin No. 55, Minnesota No. 325.	
2701	Suffolk Chevalier	Sterile	do	do	do		Lax	Chevalier	England	Canada		Suffolk Coast, Chevalier No. 1.
2702	do	do	do	do	do		do	do	do	do		Suffolk Coast, Chevalier No. 2.
2703	Monck	do	do	do	do					do		
2704	Douglas	do	do	do	do					do		
2705	Monde Hull-less	Fertile	Naked	do	do				Central Asia			
2706	Fulton	Sterile	Hulled	do	do			Hybrid		Canada		
2707	Success	Fertile	do	Hooded	do			do	Nepal ×	do		
2708	Pelham	Sterile	do	Awned	do			do	Royal × Beaver	Ottawa, Canada		
2709	Parkin	Fertile	do	Hooded	do			do	Royal × Success	do		
2710	Monro	do	do	Awned	do			do	do	do		
2711	Lytton	do	do	do	do			do	Royal × Beaver	do		
2712	Fichtel Mountain	Sterile	do	do	do		Lax	Hanna	Germany	Canada		
2713	Bestehorn Kaiser	do	do	do	do		Dense	Thorpe	do	do		
2715	Turkestan	Fertile	Naked	do	do					do	North Dakota No. 455	

2716	Escourgeon	do	Hulled	do	do				France	do		
2717	Black Japan	do	do	do	Black				Japan	do		
2718	Bere	do	do	do	White				England	do		
2719	Eclipse	do	do	do	do				Plant selection	Garton Bros., England.		
2720	Archer Chevalier	Sterile	do	do	do		Lax	Chevalier	England	Canada		
2721	Taganrog	Fertile	do	do	do			Odessa	Russia	do		
2722	Small Blue Naked	do	Naked	do	do			Himalaya	South-central Asia	do		
2723	Old Irish	Sterile	Hulled	do	do				Ireland	do		
2724	Caucasian	do	Naked	do	do			Baku	South-central Asia	do		Caucasian Hull-less.
2725	Early Chevalier	do	Hulled	do	do		Lax	Chevalier	Plant selection	Ottawa, Canada		
2726	Black	do	do	do	Black				Asia Minor	Canada	Minnesota No. 369.	Black Two-Row.
2727	Leader	do	do	do	White					do		
2728	Kutais	do	do	do	do				Caucasia	do		
2731	Cole	Fertile	do	do	do					do		
2732	Charlottetown 80	Sterile	do	do	do		Lax	Chevalier	Plant selection	Charlottetown, Prince Edward Island.		
2733	English Chevalier	do	do	do	do		do	do	England	Canada		Old Island Two-Rowed.
2734	Chousk	Fertile	Naked	do	do				Turkestan	Various		Hordeum Chousk.
2735	Chinese Hull-less	do	do	do	do				China	Canada		
2736	Oregon	Sterile	Hulled	do	do		Lax	Chevalier	England	do		
2737	Odessa	do	do	do	do		do	Orel	Russia	do		
2738	Prolific	do	do	do	do		do	Chevalier	England	do		Wrinch Prolific.
2739	Emerson	do	do	do	do		Dense	Thorpe	do	do		
2740	Garton 68	Fertile	do	do	do					do		
2741	Arnt	Sterile	do	do	do					Williston, N. Dak.		
2742	Flaxton	do	do	do	do					do		
2743	Krogstadt	Fertile	do	do	do					do		
2744	Tioga	do	do	do	do					do		
2745	Beardless 20	do	do	Hooded	do			Hybrid	Tennessee Winter × Horsford.	Knoxville, Tenn.		
2746	Beardless 6	do	do	do	do			do	do	do		
2748	Norwegian	do	do	Awned	do				Norway	Madison, Wis.	Wisconsin No. 50	
2749	Gottland	Sterile	do	do	do				Plant selection	Svalof, Sweden	Minnesota No. 267.	
2750	Canadian Lake Shore.	Fertile	do	do	do			Manchuria	Manchuria	Various	Minnesota No. 253.	
2752	Garton 936									Madison, Wis.	Wisconsin No. 80	
2753	Golden Queen	Fertile	Hulled	Awned	White			Manchuria	Plant selection	do	Wisconsin Pedigree 3.	Manchuria.
2754	Silver King	do	do	do	do			do	do	do	Wisconsin Pedigree 15.	Do.
2756	Manchuria	do	do	do	do			do	do	do	Wisconsin Pedigree 12.	
2758	do	do	do	do	do			do	do	do	Wisconsin Pedigree 11.	Manshury.
2760	do	do	do	do	do			do	do	do	Wisconsin Pedigree 10.	Do.

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
2761	Wisconsin Pedigree 20.	Fertile	Hulled	Awned	White			Manchuria	Plant selection	Madison, Wis		
2762	Manchuria	do	do	do	do			do	do	do	Wisconsin Pedigree 19.	Mansbury.
2763	Wisconsin Pedigree 18.	do	do	do	do			do	do	do		
2764	Manchuria	do	do	do	do			do	do	do		Do.
2765	Wisconsin Pedigree 17.	do	do	do	do			do	do	do		
2766	Wisconsin Pedigree 35.	do	do	do	do			do	do	do		
2767	Scotch Chevalier	Sterile	do	do	do		Lax	Chevalier	England			Chevalier.
2768	Chevalier	do	do	do	do		do	do	do			Do.
2769	Berkley									Bozeman, Mont		
2770	Nephant									do		Probably Nepal.
2771	Chevalier	Sterile	Hulled	Awned	White		Lax	Chevalier	England	do		
2772	Chile Brewing									do		
2773	Hanna	Sterile	Hulled	Awned	White		Lax	Hanna	Germany	do		
2774	Manchuria	Fertile	do	do	do			Manchuria	Manchuria	do		Oderbrucker.
2775	Shansi	do	Naked	do	do				China	do		Shansi Hull-less.
2776	Spear									do		Spear and Mason
2777	Beldi Giant	Fertile	Hulled	Awned		Blue		Coast	Plant selection	Davis, Calif		Beldi, Coast.
2778	Manchuria	do	do	do	White			Manchuria	Manchuria	Wooster, Ohio		
2779	Great Beardless									La Fayette, Ind		
2780	Oderbrucker	Fertile	Hulled	Awned	White			Manchuria	Manchuria	do		Manchuria.
2781	Stoeckinger									do		
2782	Michigan	Sterile	Hulled	Awned	White					do		
2783	Manchuria	Fertile	do	do	do			Manchuria	Manchuria	Colorado		
2784	Hanna	Sterile	do	do	do		Lax	Hanna	Germany	do		
2785	Coast	Fertile	do	do	do			Coast	Plant selection	do		
2786	Hanna	Sterile	do	do	do		Lax	Hanna	do	do		
2787	do	do	do	do	do		do	do	do	do		
2788	do	do	do	do	do		do	do	do	do		
2789	Coast	Fertile	do	do	do			Coast	do	do		
2790	do	do	do	do	do			do	do	do		
2791	do	do	do	do	do			do	do	do		
2792	Colsess	do	do	Hooded		Blue		Hybrid		do		
2793	Bark	do	do	Awned	White		Dense			do	Minnesota No. 444.	

2794	Giant									South Dakota		
2795	Russian	Fertile	Hulled	Awned	White				Russia	U.S.D.A., Fargo, N. Dak.	North Dakota No. 107.	
2796	New Moravian	Sterile	do	do	do		Lax	Hanna	Czechoslovakia	Edgeley, N. Dak		
2797	Dutrow Winter	Fertile	do	do	do			Tennessee Winter.	Europe	Maryland		
2798	Osaka	do	do	do	do				Plant selection	U. S. D. A., Arlington Farm, Va.		
2799	Moister	do	do	Smooth awned.	do			Hybrid	Lion × Manchuria.	U. S. D. A., St. Paul, Minn.	Minnesota No. 11-17-2.	
2800	Elfry	do	do	do	do			do	Lion × Featherston.	do	Minnesota No. 11-16-91.	
2801	Thomas	do	do	Awned	do					Scottsbluff, Nebr		
2802	Chevalier	Sterile	do	do	do		Lax	Chevalier	England	Madison, Wis	North Dakota No. 170.	
2803	Saxonian									do		
2805	Sibley Imperial	Fertile	Hulled	Awned	White			Hybrid	6-Row × 2-Row	Charlotte, Vt		
2806	Hungarian Hull-less.									Madison, Wis		
2807	Success	Fertile	Hulled	Hooded	White			Hybrid	Nepal ×	do		
2808	Arizona									East Lansing, Mich.		
2809	Semibarbless	Fertile	Hulled	Smooth awned.	Black				Plant selection	do		
2810	Crawford									do		
2811	Six-Row	Fertile	Hulled	Awned	White					State College, N. Mex.		
2812	Hull-less									do		
2813	O. A. C. Selection 8.									do		
2814	O. A. C. Selection 7.									do		
2815	Russian Naked									Lincoln, Nebr		
2816	Garton 5004									do		
2817	Garton 5003									do		
2818	Garton 5002									do		
2819	Garton 5001									do		
2820	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Manchuria	do		
2821	Coast	do	do	do	do			Coast	Plant selection	Davis, Calif	California No. 2265.	California No. 4000.
2823	Manchuria	do	do	do	do			Manchuria	Manchuria × Manchuria.	St. Paul, Minn	Minnesota No. 388.	
2824	Empress	Sterile	do	do	do				England	Canada		
2825	Culver									St. Paul, Minn., Fargo, N. Dak.	North Dakota No. 257, Minnesota No. 86.	
2826	South African	Fertile	Hulled	Awned	White		Dense	Winter Club.		St. Paul, Minn		
2827	Manchuria	do	do	do	do			Manchuria	Plant selection	do	Minnesota No. 158.	

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
2828	Duckbill Bald							Hybrid		St. Paul, Minn.	Minnesota No. 125.	
2829	Brush	Sterile	Hulled	Awned	White					do	Minnesota No. 126.	
2830	Ross	Fertile	do	do	do					do	Minnesota No. 127.	
2831	Manchuria	do	do	do	do			Manchuria	Plant selection	do	Minnesota No. 129.	
2832	Crop Nursery	do	do	do	do				do	do	Minnesota No. 130.	
2833	Hybrid	Sterile	do	do	do			Hybrid	2-rowed × branching Duckbill.	do	Minnesota No. 131.	
2834	do	do	do	do	do			do	Black × long 2-rowed.	do	Minnesota No. 132.	
2835	Manchuria	Fertile	do	do	do			Manchuria	Plant selection	do	Minnesota No. 134.	
2836	do	do	do	do	do			do	do	do	Minnesota No. 135.	
2837	do	do	do	do	do			do	do	do	Minnesota No. 136.	
2838	Hybrid	Sterile	do	do	do			Hybrid	2-rowed × branching Duckbill.	do	Minnesota No. 137.	
2839	do	do	do	do	do			do	Black × long 2-rowed.	do	Minnesota No. 138.	
2840	do	do	do	do	do			do	do	do	Minnesota No. 139.	
2841	do	do	do	do	do			do	6-row smooth × 2-row Indian Head.	do	Minnesota No. 140.	
2842	do	Fertile	do	do	do			do	do	do	Minnesota No. 141.	
2843	do	do	do	do	do			do	do	do	Minnesota No. 142.	
2844	do	Sterile	do	do	do			do	do	do	Minnesota No. 143.	
2845	do	do	do	do	do			do	do	do	Minnesota No. 144.	
2846	do	Mixed						do	do	do	Minnesota No. 145	
2847	do	Sterile	Hulled	Awned	White			do	do	do	Minnesota No. 146.	

2848	Manchuria	Fertile	do	do	do			Manchuria	Plant selection	do	Minnesota No. 159.
2849	do	do	do	do	do			do	do	do	Minnesota No. 160.
2850	do	do	do	do	do			do	do	do	Minnesota No. 161.
2851	do	do	do	do	do			do	do	do	Minnesota No. 162.
2852	do	do	do	do	do			do	do	do	Minnesota No. 163.
2853	do	do	do	do	do			do	do	do	Minnesota No 164.
2854	do	do	do	do	do			do	do	do	Minnesota No. 165.
2855	do	do	do	do	do			do	do	do	Minnesota No. 166.
2856	do	do	do	do	do			do	do	do	Minnesota No. 167.
2857	do	do	do	do	do			do	do	do	Minnesota No. 168.
2858	do	do	do	do	do			do	do	do	Minnesota No. 170.
2859	do	do	do	do	do			do	do	do	Minnesota No. 171.
2860	do	do	do	do	do			do	do	do	Minnesota No. 172.
2861	do	do	do	do	do			do	do	do	Minnesota No. 173.
2862	do	do	do	do	do			do	do	do	Minnesota No. 174.
2863	do	do	do	do	do			do	do	do	Minnesota No. 175.
2864	do	do	do	do	do			Ro	do	do	Minnesota No. 176.
2865	do	do	do	do	do			do	do	do	Minnesota No. 177.
2866	do	do	do	do	do			do	do	do	Minnesota No. 178.
2867	do	do	do	do	do			do	do	do	Minnesota No. 179.
2868	do	do	do	do	do			do	do	do	Minnesota No 181.
2869	do	do	do	do	do			do	do	do	Minnesota No. 182.
2870	do	do	do	do	do			do	do	do	Minnesota No. 183.
2871	do	do	do	do	do			do	do	do	Minnesota No. 185.
2872	do	do	do	do	do			do	do	do	Minnesota No. 186.
2873	do	do	do	do	do			do	do	do	Minnesota No. 188.

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
2874	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Plant selection	St. Paul, Minn	Minnesota No. 189.	
2875	Hybrid	do	do	do	do			Hybrid	6-row smooth × 2-row Indian Head.	do	Minnesota No. 190.	
2876	do							do	do	do	Minnesota No. 191.	
2877	Chevalier	Sterile	Hulled	Awned	White		Lax	Chevalier	England	do	Minnesota No. 192.	
2878	Frankish Brewing.	do	do	do	do		do	Hanna	Germany	do	Minnesota No. 197.	
2879	Manchuria	Fertile	do	do	do			Manchuria	Plant selection	do	Minnesota No. 157.	
2880	Daniels	do	do	do	do			do	Manchuria	do	Minnesota No. 196.	
2881	Manchuria	do	do	do	do			do	Plant selection	do	Minnesota No. 208.	
2882	do	do	do	do	do			do	do	do	Minnesota No. 209.	
2883	do	do	do	do	do			do	do	do	Minnesota No. 210.	
2884	do	do	do	do	do			do	do	do	Minnesota No. 211.	
2885	do	do	do	do	do			do	do	do	Minnesota No. 212.	
2886	Hanna	Sterile	do	do	do		Lax	Hanna	do	do	Minnesota No. 213.	
2887	Silver Beardless	do	do	Hooded	do			Hybrid	do	do	Minnesota No. 214.	
2888	Hybrid	do	do	Awned	do			do	Manchuria × Champion of Vermont.	do	Minnesota No. 218.	
2889	do	do	do	do	do			do	do	do	Minnesota No. 219.	
2890	do	Fertile	do	do	do			do	Manchuria × Chevalier.	do	Minnesota No. 220.	
2891	do	do	do	do	do			do	do	do	Minnesota No. 221.	
2892	do	Sterile	do	do	do			do	Manchuria × Champion of Vermont.	do	Minnesota No. 222.	

2893	do	Fertile	do	do	do			do	Champion of Vermont × Manchuria.	do	Minnesota No. 223.
2894	do	do	do	do	do			do	6-row smooth × 2-row Indian Head.	do	Minnesota No. 224.
2895	do	do	do	do	do			do	do	do	Minnesota No. 225.
2896	do	do	do	do	do			do	do	do	Minnesota No. 226.
2897	Cheney	Sterile	do	do	do		Lax	Hanna	Plant selection	do	Minnesota No. 227.
2898	Australian White	do	do	do	do		do	do	do	do	Minnesota No. 228.
2899	Champion of Vermont.	do	do	do	do		do	do	do	do	Minnesota No. 229.
2900	French Chevalier	do	do	do	do		do	Chevalier	do	do	Minnesota No. 230.
2901	Golden Queen	Fertile	do	do	do			Manchuria	do	do	Minnesota No. 231.
2902	Hanna	Sterile	do	do	do		Lax	Hanna	Austria	do	Minnesota No. 234.
2903	Manchuria	Fertile	do	do	do			Manchuria	Plant selection	do	Minnesota No. 315.
2904	do	do	do	do	do			do	do	do	Minnesota No. 316.
2905	do	do	do	do	do			do	do	do	Minnesota No. 317.
2906	do	do	do	do	do			do	do	do	Minnesota No. 318.
2907	do	do	do	do	do			do	do	do	Minnesota No. 319.
2908	do	do	do	do	do			do	do	do	Minnesota No. 320.
2909	Malting	do	do	do	do			do	do	do	Minnesota No. 298.
2910	Chevalier	Sterile	do	do	do		Lax	Chevalier	do	do	Minnesota No. 299.
2911	Hybrid	Fertile	do	do	do			Hybrid	6-row smooth × 2-row Indian Head.	do	Minnesota No. 311.
2912	do	do	do	do	do			do	do	do	Minnesota No. 312.
2913	do	do	do	do	do			do	do	do	Minnesota No. 313.
2914	do	do	do	do	do			do	do	do	Minnesota No. 314.
2915	Manchuria	do	do	do	do			Manchuria	Manchuria × Manchuria.	do	Minnesota No. 321.
2916	do	do	do	do	do			do	do	do	Minnesota No. 322.
2917	do	do	do	do	do			do	do	do	Minnesota No. 323.

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
2918	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Manchuria × Manchuria.	St. Paul, Minn.	Minnesota No. 324	
2919	Hanna	Sterile	do	do	do		Lax	Hanna	Plant selection	do	Minnesota No. 356	
2920	Baku	do	Naked	do	do			Baku	do	do	Minnesota No. 379	
2921	Coast	Fertile	Hulled	do	do			Coast	do	do	Minnesota No. 382	
2922	Scotch	do	do	do	do			Manchuria	do	do	Minnesota No. 383	
2923	Mansfield	do	do	do	do			Hybrid	Duckbill × Rennie Improved.	do	Minnesota No. 384	
2924	Mensury	do	do	do	do			Manchuria	Plant selection	do	Minnesota No. 385	
2925	Manchuria	do	do	do	do			do	Golden Queen × Manchuria.	do	Minnesota No. 386	
2926	do	do	do	do	do			do	Manchuria × Manchuria.	do	Minnesota No. 387	
2927	do	do	do	do	do			do	do	do	Minnesota No. 389	
2928	do	do	do	do	do			do	do	do	Minnesota No. 390	
2929	do	do	do	do	do			do	Golden Queen × Manchuria.	do	Minnesota No. 391	
2930	do	do	do	do	do			do	do	do	Minnesota No. 392	
2931	Hybrid	do	do	do	do			Hybrid	Golden Queen × Blue.	do	Minnesota No. 410	
2932	do	do	do	do	do			do	Blue × Golden Queen.	do	Minnesota No. 414	
2933	Bohman	Sterile	do	do	do		Lax	do	Bohemian × Manchuria.	U. S. D. A., St. Paul, Minn.	Minnesota No. 11-16-78.	
2935	Hybrid	Fertile	do	Smooth awned.	do			do	Lion × Manchuria.	do	Minnesota No. 438	
2936	Black	Sterile	do	Awned	Black				Asia Minor	St. Paul, Minn.	Minnesota No. 417	
2937	Senca Purple	Fertile	do								North Dakota No. 681	
2938	Hoover Hull-less									Fargo, N. Dak.	North Dakota No. 234	
2939	Hull-less									do		
2941	Highland Scotch	Sterile	Hulled	Awned	White				Scotland	do	North Dakota No. 168	
2942	Carter	Fertile	do	do	do				England	do		
2943	Salzer	Sterile	do	do	do		Lax	Chevalier	do	do		

2944	Manchuria	Fertile	do	do	do			Manchuria	Plant selection	do	North Dakota No. 2118	
2945	do	do	do	do	do			do	do	do	North Dakota No. 2119	
2946	do	do	do	do	do			do	do	do	North Dakota No. 2120	
2947	do	do	do	do	do			do	do	do	North Dakota No. 2121	
2948	Hull-less									do	North Dakota No. 2122	
2949	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Plant selection	do	North Dakota No. 2123	
2950	do	do	do	do	do			do	do	do	North Dakota No. 2124	
2951	do	do	do	do	do			do	do	do	North Dakota No. 2125	
2952	do	do	do	do	do			do	do	do	North Dakota No. 2126	
3112	Common	do	do	do	do					State College, Pa		
3113	Rottingham	Sterile	do	do	do		Lax	Chevalier	England	do		
3114	Brewers Delight	do	do	do	do					do		
3115	Winter	Fertile	do	do	do					do		
3116	Common Two-Row	Sterile	do	do	do					do		
3117	Nonpareil									do		
3118	Montana	Sterile	Hulled	Awned	White					Urbana, Ill		Montana Two-Rowed.
3121	Marsbury									Union, Oreg		
3122	Union									do	Union No. 23-5	
3123	do									do	Union No. 24-1	
3124	do									do	Union No. 30-18	
3125	do									do	Union No. 33-24	
3126	do									do	Union No. 35-1	
3127	do									do	Union No. 31-24	
3128	do									do	Union No. 37-13	
3129	do									do	Union No. 38-2	
3130	do									do	Union No. 38-14	
3131	do									do	Union No. 48-B-3	
3132	do									do	Union No. 48-B-4	
3133	do									do	Union B-9	
3134	do									do	Union EEE-1	
3135	New Hull-less									do		
3136	Crawford									East Lansing, Mich.		
3137	do									do		
3138	do									do		
3139	do									do		
3140	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Plant selection	do	Michigan No. 72518	
3141	do	do	do	do	do			do	do	do	Michigan No. 72523	
3142	do	do	do	do	do			do	do	do	Michigan No. 72539	
3143	do	do	do	do	do			do	do	do	Michigan No. 72546	
3144	Beardless									Crookston, Minn		
3145	do									Moscow, Idaho		
3146	Oderbrucker	Fertile	Hulled	Awned	White			Manchuria	Manchuria	do		
3147	California Centgener.									do		
3148	Virginia Selection									Blacksburg, Va		
3149	do									do	Blacksburg 1, Blacksburg 2.	

TABLE 94.—*Accession data of varieties of barley arranged in the order of their Cereal Investigations numbers*—Continued

C. I. No.	Name	Description						Group	Probable origin	Immediate source	Designations	Synonyms
		Lateral florets	Adherence	Appendages to central florets	Color of lemma	Color of caryopsis	Density					
3150	Virginia Selection									Blacksburg, Va	Blacksburg 3	
3151	do									do	Blacksburg 4	
3152	do									do	Blacksburg 5	
3153	do	Fertile	Hulled	Awned	White					do	Blacksburg 6	
3154	do									do	Blacksburg 7	
3155	do									do	Blacksburg 8	
3156	do									do	Blacksburg 9	
3157	do									do	Blacksburg 11	
3158	Hull-less									do	Blacksburg 10	
3159	Virginia Selection									do	Blacksburg 64	
3160	Winter									do	Blacksburg 40	
3161	Winter Beardless									do	Blacksburg 45	
3162	Tennessee	Fertile	Hulled	Awned	White			Tennessee Winter.	Europe	do	Blacksburg 46	
3163	Virginia Selection								Plant selection	do	Two-rowed from Selection 7.	
3164	do								do	do	Six-rowed from Selection 7.	
3165	Chevalier	Sterile	Hulled	Awned	White		Lax	Chevalier	England	do		
3166	Manchuria	Fertile	do	do	do			Manchuria	Manchuria	do	Blacksburg 30	Manchury.
3167	do	do	do	do	do			do	do	do	Blacksburg 20	
3168	Hybrid							Hybrid	Rice × Beardless	Lind, Wash		
3170	Caswell									Durham, N. H		
3171	Horsford	Fertile	Hulled	Hooded	White			Hybrid	Nepal ×	Manhattan, Kans	Kansas No. 8001	
3172	Manchuria	do	do	Awned	do			Manchuria	Plant selection	do	Kansas No. 7015	
3173	do	do	do	do	do			do	do	do	Kansas No. 8022	
3174	do	do	do	do	do			do	do	do	Kansas No. 8028	
3175	do	do	do	do	do			do	do	do	Kansas No. 8030	
3176	Bonanza	do	do	do	do			do	do	do	Kansas No. 8032	
3177	do	do	do	do	do			do	do	do	Kansas No. 8049	
3178	Two-Row Brewing.	Sterile	do	do	do					Durham, N. H		
3179	Union								Plant selection	Union, Oreg	Union No. 28-2	
3180	Two-Row Hull-less.									Blacksburg, Va		
3181	O. A. C. Winter									Burns, Oreg		
3182	Manchuria	Fertile	Hulled	Awned	White			Manchuria	Manchuria	Hays, Kans	Hays No. 57	

In Table 94 the terms relating to the fertility of lateral florets must necessarily be definite. The central floret is always fully fertile. In the 6-rowed barleys the lateral florets also are fertile. In the 2-rowed varieties they are present but sterile. Besides these two classes, which include all our common varieties, there are two other groups, the homozygous intermediate and the deficient. In the intermediate barleys the lateral florets are fertile, but the resulting kernels are usually smaller than in the 6-rowed varieties, and the percentage of fertility is lower. The most conspicuous characteristic of the intermediate barley is in the lack of appendages on the lateral floret. These florets are characterized by rounded lemmas, while the central ones may bear long awns or hoods.

The fourth variation, the deficient barleys, concerns a still further reduction of the lateral florets than is found in the common 2-rowed varieties. These barleys are 2-rowed, of course, but the lateral spikelets are reduced to the outer glumes and lemma. The palet is sometimes present, but sexual organs are never found.

BOTANICAL COMPARISON OF PROMINENT VARIETIES

It is quite obvious that the abridged description given in Table 94 affords only a general conception of the nature of the varieties. The separation of similar strains from the same parent stock is very difficult. It is the opinion of the writers that the nomenclature used in taxonomic work should not be carried beyond the major groups. The variations of barley are so numerous that the varieties can be arranged in a great number of ways.

If an attempt is made to gather these under named taxonomic groups, it is impossible to avoid placing forms of totally different and unrelated adaptation in a group where the type variety is ecologically unrelated to them. Thus, if the Svalof characters of minor variation, such as the toothing of the nerves and the nature of the basal bristle, are appended to the usual classifications it is perfectly possible, even in the ultimate divisions of morphological groupings, to find a winter variety suited to the arid conditions of North Africa occurring as a variation of a spring variety from Manchuria suited to humid conditions.

TABLE 95.—*Botanical comparison of prominent varieties of barley*

[Many of these characters are not comparable unless grown under identical conditions. *Explanation.*—In column 3: D=deficient, I=intermediate, 2=2-rowed, 6=6-rowed. In column 4: H=hulled, N=naked. In column 5: A=awned, Al=awnless, H=hooded, Sa=smooth awned. In column 6: *=1 head only, †=variable. In column 7: L=long, S=short, LS=mixed (both long and short). In column 8: B=blue, Bk=black, BW=blue and white, V=violet, W=white. In column 10: A=Aberdeen, Idaho; Ag=Arlington Farm, Va. (greenhouse); Ak=Akron, Colo.; C=Chico, Calif.; D=Davis, Calif.; Di=Dickinson, N. Dak.; S=St. Paul, Minn.; W=Madison, Wis.

Variety and station No.	C. I. No.	Fertility	Caryopsis	Lemma	Spike density (mm.)	Rachilla	Color	Seed length (mm.)	Place and year grown	At Aberdeen, Idaho, in 1921	
										Awns emerged	Culm length (cm.)
1	2	3	4	5	6	7	8	9	10	11	12
Charlottetown 80	2732	2	H	A	3.5	S	W	9.1	A 1921	July 30	94
Chevalier II	200	2	H	A	3.6	S	W	9.2	A 1921	do	86
French Chevalier	175	2	H	A	3.5	S	W	7.9	Ag 1923		
Horn	926	2	H	A	3.6	S	W	9.0	A 1921	July 28	101

TABLE 95.—*Botanical comparison of prominent varieties of barley*—Continued

Variety and station No.	C. I. No.	Fertility	Caryopsis	Lemma	Spike density (mm.)	Rachilla	Color	Seed length (mm.)	Place and year grown	At Aberdeen, Idaho, in 1921	
										Awns emerged	Culm length (cm.)
1	2	3	4	5	6	7	8	9	10	11	12
Canadian Thorpe	740	2	H	A	2.2	L	W	8.1	C 1921	------	------
Primus	532	2	H	A	2.4	S	W	10.3	D 1922	------	------
Manchuria (Minn. 6)	241	6	H	A	3.3	L	W	8.5	A 1921	July 27	100
Manchuria (Minn. 105)	244	6	H	A	3.4	LS	B	8.6	A 1921	July 24	113
Manchuria (Minn. 184)	2330	6	H	A	3.4	S	BW	8.8	A 1921	July 25	111
O. A. C. 21	1470	6	H	A	3.5	S	B	8.8	A 1921	July 26	102
Manchurian (no sample)	739	6	H	A	3.4	S	B	10.5	D 1923	------	------
Mensury (no sample)	2657	6	H	A	------	------	------	------	------	------	------
Featherston	1120	6	H	A	3.6	S	B	9.3	A 1921	July 23	100
Oderbrucker	836	6	H	A	3.9	LS	BW	8.8	A 1921	July 24	113
Oderbrucker (S. Dak. 178).	1174	6	H	A	3.9	S	W	8.8	A 1920	------	------
Oderbrucker (Wis. Ped. 5).	1272	6	H	A	3.7	S	W	8.8	A 1921	July 24	103
Oderbrucker (Wis. Ped. 6).	1529	6	H	A	4.1	S	W	9.0	A 1921	July 26	111
Hanna	203	2	H	A	3.8	L	W	9.4	A 1921	do	88
Gold	1145	2	H	A	3.4	L	W	8.8	A 1921	July 30	90
Hannchen	531	2	H	A	3.4	L	W	9.9	A 1921	July 29	93
Odessa	182	6	H	A	3.5	S	W	9.2	A 1921	July 20	92
Svanhals	187	2	H	A	2.5	L	W	9.5	A 1921	July 30	92
Gatami	575	6	H	A	3.5	L	Bk	9.0	A 1921	July 20	91
Princess	529	2	H	A	3.4	L	W	9.5	C 1917	------	------
Lion	923	6	H	A	4.0	L	Bk	9.6	A 1921	July 23	94
Mansury	617	2	H	A	2.5	L	W	------	Di 1907 Ak 1908	------	------
Coast	626	6	H	A	3.4	S	B	10.4	A 1921	July 19	87
Do	690	6	H	A	3.1	S	B	10.1	A 1921	July 17	90
Beldi Giant	2777	6	H	A	3.4	S	B	10.5	A 1921	July 23	83
Sandrel	937	6	H	A	3.2	S	W	9.1	C 1919	------	------
Stavropol	2103	6	H	A	3.3	S	B	10.2	A 1921	July 23	87
Peruvian	935	6	H	A	3.7	S	B	11.2	A 1921	July 21	97
Telli	194	6	H	A	4.2	LS	B	10.6	A 1921	July 24	79
Poda	652	6	H	A	3.7	S	B	10.5	A 1921	July 23	96
Club Mariout	261	6	H	A	2.6	S	W	10.6	A 1921	July 16	76
California Mariout	1455	6	H	A	3.7	L	B	10.2	A 1921	July 13	55
White Smyrna	195	2	H	A	3.6	L	W	10.2	A 1921	July 20	62
Do	658	2	H	A	4.0	L	W	10.2	A 1921	do	67
Beldi Dwarf	190	6	H	A	2.6	L	BW	10.3	A 1921	July 16	66
Nepal	595	6	N	H	2.7	L	W	8.0	A 1921	July 25	92
Himalaya	620	6	N	A	3.4	L	B	8.5	A 1921	July 24	85
Trebi	936	6	H	A	3.5	S	B	10.6	A 1921	do	93
Baker	975	6	H	A	3.5	S	W	10.6	A 1921	July 22	90
Black Hull-less	596	6	N	A	3.1	L	V	7.9	A 1921	July 23	96
Baku	709	2	N	A	4.4	L	W	9.5	A 1921	July 22	82
Olonets	198	6	H	A	3.1	S	W	9.4	D 1922	------	------
Tennessee Winter	257	6	H	A	3.0	S	W	8.6	C 1918	------	------
Ohio Winter	2033	6	H	A	*3.8	S	W	10.2	S 1921	------	------
Winter Club	592	6	H	A	1.7	L	W	9.5	A 1921	Aug. 8	72
Wisconsin Winter	519	6	H	A	3.7	S	B	9.9	A 1921	July 21	75
Orel	351	2	H	A	3.8	LS	W	9.2	A 1921	Aug. 1	77
Turkestan	711	6	H	A	3.1	L	B	9.0	------	------	------
Blackhull	878	D	H	A	3.5	S	Bk	10.1	A 1921	July 16	78
Han River	206	6	H	A	3.9	S	B	9.9	A 1921	July 18	89
Nakano Wase (Pl. III, fig. 1, D).	754	I	H	Al	2.5	L	W	8.0	Ag 1920	------	------
Meloy	1176	6	H	H	†3.2	S	B	9.5	A 1921	July 24	97
Flynn	1311	6	H	Sa	3.9	L	W	9.9	A 1921	July 17	93
Horsford	507	6	H	H	3.4	S	W	8.8	A 1921	July 29	114
Stella	2678	6	H	A	4.0	S	W	8.1	Ag 1923	------	------
Alpha	959	2	H	A	3.3	S	W	9.0	A 1921	July 26	96
Minsturdi (Minn. 437)	1556	6	H	A	2.4	S	W	8.8	A 1921	July 22	96
Svansota (Minn. 1140)	1907	2	H	A	2.9	L	W	9.4	A 1921	July 30	90
Hanchamont	1121	2	H	A	2.7	L	W	8.0	C 1921	------	------
Yale	1592	6	H	A	3.3	S	W	9.5	A 1921	July 25	85
Standwell (no sample)	584	2	H	A	------	L	W	9.3	W 1907	------	------
Early Chevalier	2725	2	H	A	3.2	L	W	8.4	Ag 1923	------	------
Invincible	590	2	H	A	2.0	L	W	8.1	C 1921	------	------
Blue Long Head (no sample).	2685	6	H	A	------	------	B	------	------	------	------

As far as the agronomic classification is concerned the ecological features with their relation to season and rainfall are of more importance than the taxonomic ones. Some of the physiological differences which are expressed in height, time of flowering, or even in yield are the ones on which the final distinctions between varieties are likely to be made. In 1921 a large collection of barleys from various experiment stations was grown at Aberdeen, Idaho. The observations made on a few of these are shown in Table 95. One of the most useful observations made was the time of emergence of awns, which is shown in column 11 in this table. The date the awns emerged from the leaf sheath was noted. This is a much more accurate statement of the stage of development than the time of ripening. It can be much more accurately taken, and the plants at this time are not affected in their rate of development by disease and usually not by diminution of water supply. The great difference in appearance which is represented by only one or two days in the time of emergence of the awns can be appreciated only in the field.

It is certain that as our selected varieties are increased in number by the many agencies now working in barley improvement, their separation will become more and more difficult. Most certainly varieties will be put out which are indistinguishable. It is important that their relationships be studied, and some such system as was used at Aberdeen in 1921 is likely to be useful. The occasional assembling of the varieties at a single place would serve to detect the confusion which is inevitable when so many are handled by a large number of stations.

BEST VARIETIES OF THE PERIOD FROM 1917 TO 1921, INCLUSIVE

Emphasis throughout this bulletin has been placed on group yields and on the ecological and regional adaptation of types. Specific varieties have been mentioned from time to time as having done well at the stations. Since the methods and equipment of testing in the earlier years were obviously imperfect the performances of individual sorts were not stressed. In the last five years covered, however, replications of plats and other improvements have been common, and most of the varieties tested were pure-line selections.

In Table 96 the varieties giving the best yield in some or all of the five years from 1917 to 1921, inclusive, at each station, are listed in the order of productiveness. It will be noticed that very few nonpedigreed varieties are included. The few that are found are for the most part very definite types, such as White Smyrna (C. I. No. 195) and Club Mariout (C. I. No. 261). But very little can be added in the way of amplifying the facts brought out in the table. The material contained should be of use to agronomists in obtaining varieties for testing which have done well at near-by stations, but which for some reason have not been included in their plats.

TABLE 96.—*Varieties of barley giving the best yields at different stations in part or all of the five years from 1917 to 1921, inclusive, listed in order of yield*

[A figure in parentheses following the name of a variety indicates that such variety was grown only for the number of years thus shown, not for the entire five years. In like manner F=sown in fall; S=sown in spring]

Place	Number of varieties compared	First variety		Second variety		Third variety		Fourth variety		Fifth variety	
		Name	C. I. No.	Name	C. I. No.	Name	C. I. No.	Name	C. I. No.	Name	C. I. No.
Storrs, Conn	3	Wisconsin Pedigree	835	Oderbrucker	1273	O. A. C. 21	1470				
Ithaca, N. Y	15	Oderbrucker (4)	1272	Manchuria (4)	2823	Oderbrucker (4)	836	Trebi (4)	936	Hanchamont (4)	1121
State College, Pa	6	Charlottetown 80	2732	Lion (2)	923	Michigan (2)	2782	Wisconsin Pedigree (2).	835	Wing Pedigree (3)	1177
Wooster, Ohio	5	Ohio Winter (4)	2033	Texas Winter (4)	554	Michigan Winter (3)	2036	Wisconsin Pedigree	835	Oderbrucker	836
East Lansing, Mich	18	Crawford (3)	3138	Crawford (3)	3137	Gold (3)	1145	Crawford (3)	3139	Crawford (3)	3136
La Fayette, Ind	9	Lion (2)	923	Manchuria (3)	2330	Oderbrucker (2)	1529	Michigan (2)	2782	Wisconsin Pedigree (4).	835
Urbana, Ill	5	Wisconsin Pedigree	835	Oderbrucker	836	Horsford	507	Montana	3118	Nepal	595
De Kalb, Ill	6	Oderbrucker	836	Wisconsin Pedigree	835	Lion	923	Horsford	507	Montana	3118
Madison, Wis	10	O. A. C. 21 (4)	1470	Oderbrucker	1529	Oderbrucker	1272	Manchuria	1275	Manchurian	739
St. Paul, Minn	10	Minsturdi (4)	1556	Manchuria	2330	Aker (3)	1577	Svansota (4)	1907	French Chevalier	2900
Waseca, Minn	8	Manchuria (4)	2330	Hybrid (3)	2935	Minsturdi (3)	1556	French Chevalier (4)	2900	Samofa (2)	1211
Duluth, Minn	6	Svansota (3)	1907	French Chevalier (3)	2900	Manchuria (3)	2330	Manchuria (2)	1189	Manchuria (2)	1478
Grand Rapids, Minn	8	Minsturdi (3)	1556	Manchuria (4)	2330	French Chevalier (4)	2900	Svansota (3)	1907	Hybrid (3)	2935
Crookston, Minn	19	Minsturdi (3)	1556	Manchuria (3)	2330	Samofa (2)	1211	Manchuria (2)	1189	O. A. C. 21 (3)	1470
Morris, Minn	14	Manchuria (2)	1189	Manchuria (4)	2330	Manchuria (3)	2823	do	1478	Svansota (3)	1907
Ames, Iowa	10	Oderbrucker	1272	Oderbrucker	2700	O. A. C. 21	1470	Manchuria	241	Frankish	295
Columbia, Mo	35	Sandrel (3)	937	Trebi (3)	936	Featherston (3)	1120	Manchuria (3)	956	Lion (3)	923
Fargo, N. Dak	8	Manchuria (4)	2945	Manchuria (4)	2947	Lion (2)	923	Manchuria (4)	244	Wisconsin Pedigree (4).	835
Edgeley, N. Dak	4	Oderbrucker (2)	836	Manchuria (2)	244	Oderbrucker (2)	1273	Nepal (2)	595		
Mandan, N. Dak	6	White Smyrna	195	Svanhals	187	Hannchen	531	Coast	690	Club Mariout	261
Dickinson, N. Dak	18	Steigum	907	White Smyrna	658	Hanna	203	Hannchen	531	Scholey (3)	962
Williston, N. Dak	12	Hanna (4)	203	Oderbrucker (4)	888	Hannchen (4)	531	Wing Pedigree (3)	1177	Manchuria (4)	882
Brookings, S. Dak	14	Odessa (3)	182	Manchuria (3)	2156	Gatami (3)	575	Odessa (3)	2154	Manchuria (3)	244
Eureka, S. Dak	5	Odessa (2)	182	White Smyrna (2)	195	Hannchen (3)	531	Manchuria (3)	244	Gatami (1)	575
Highmore, S. Dak	15	Odessa (3)	182	do	2170	White Smyrna (2)	2171	White Smyrna (2)	2169	Coast (3)	626
Cottonwood, S. Dak	5	do	182	White Smyrna (3)	195	Gatami (3)	575	Hannchen (3)	531	Manchuria (1)	244
Newell, S. Dak. (dry land)	8	White Smyrna (3)	658	Coast (3)	690	do	575	do	531	Odessa (3)	182
Newell, S. Dak. (irrigated)	7	Trebi	936	Chevalier II	200	Hannchen (4)	531	Coast (4)	690	Silver King (3)	905
Lincoln, Nebr	16	Club Mariout (2)	261	Ace (2)	1353	O. A. C. 21 (2)	1470	White Smyrna (2)	195	Svanhals (2)	187
North Platte, Nebr	6	Trebi (2)	936	McClymont (2)	2126	Coast	690	Stavropol	2103	White Smyrna	658
Mitchell, Nebr	5	Trebi (3)	936	Barbary (3)	695	Svanhals (2)	187	Franconian (1)	680	Nepal (1)	595
Manhattan, Kans	28	Manchuria	1473	Manchuria (3)	244	Wisconsin Winter (F)	519	Coast (3)	690	Odessa	182
Hays, Kans	15	Club Mariout	261	Coast (4)	690	Gatami	575	Beldi Dwarf	190	White Smyrna	195

Colby, Kans.	14	Odessa (4)	182	Ellis (4)	2107	Coast (4)	690	Meloy (1)	1176	Stavropol (1)	2103
Garden City, Kans.	6	White Smyrna (3)	195	Odessa (3)	182	Coast (3)	690	Manchuria (3)	244	Club Mariout (1)	261
Tribune, Kans.	8	Coast (4)	690	Ellis (4)	2107	Odessa (3)	182	White Smyrna (4)	195	do	261
Havre, Mont.	12	Horn	926	Bohemian	27	Goldfoil	928	Holland	952	White Smyrna	195
Moccasin, Mont.	13	Hannchen	531	White Smyrna	910	Meloy	1176	Franconian	680	Svanhals	187
Huntley, Mont.	5	Trebi (4)	936	White Smyrna (1)	195	Chevalier II (1)	200	Hannchen (1)	531	Svanhals (1)	187
Sheridan, Wyo.	8	White Smyrna	195	Trebi	936	Svanhals	187	Coast	690	Hannchen	531
Archer, Wyo.	13	Sandrel (4)	937	Horn	926	Trebi (4)	936	White Smyrna	658	Coast	690
Fort Collins, Colo.	24	Coast (4)	2785	Hanna (4)	2784	Gold (4)	1145	Coast (4)	2790	Colsess (4)	2792
Akron, Colo.	10	Smyrna	2642	White Smyrna	195	Coast	690	Orel	351	Blackhull	878
Sandpoint, Idaho	6	Han River (2)	206	White Smyrna (2)	910	Baker (2)	975	Trebi (2)	936	Peruvian (2)	935
Moscow, Idaho	23	Winter Club (4)	488	Michigan Winter (4)	2036	Peruvian (2)	935	do	936	Wisconsin Winter (4)	519
Aberdeen, Idaho (irrigated)	9	Trebi	936	Beldi Giant	2777	Sandrel	937	Peruvian	935	Han River	206
Aberdeen, Idaho (dry land)	7	White Smyrna (2)	195	Beldi Giant (2)	2777	Club Mariout (2)	261	Trebi (2)	936	Lion (2)	923
Nephi, Utah	6	Bulgarian (F)	521	Turkestan (F)	711	Tennessee Winter (F)	257	Winter Club (F)	592	Coast (4)	690
Pullman, Wash.	13	Winter Club	592	Wisconsin Winter (3)	1894	Wisconsin Winter	519	Beldi Giant	2777	Coast	1249
Lind, Wash.	5	Coast	1249	Meloy (4)	1176	Horsford (3)	1775	White Smyrna (4)	910	Himalaya (4)	620
Moro, Oreg.	15	Club Mariout	261	Peruvian	935	Peru	2302	Flynn (4)	1311	Meloy	1176
Union, Oreg.	10	Trebi (3)	936	Horn (2)	926	White Smyrna (2)	910	Club Mariout (1)	261	Marsbury (2)	3121
Burns, Oreg. (dry land)	7	White Smyrna (3)	658	Hannchen (4)	531	Coast (4)	690	Svanhals (4)	187	Winter Club (S, 3)	592
Burns, Oreg. (irrigated)	7	Hannchen	531	White Smyrna (4)	658	Winter Club (S, 3)	592	Trebi (2)	936	Coast	690
Newlands, Nev.	7	Coast (3)	626	Trebi (3)	936	Hannchen (3)	531	Chevalier (3)	1142	Svanhals (3)	187
Chico, Calif.	18	Club Mariout	261	Poda	652	Beldi Dwarf	190	Coast	626	White Smyrna	195
Davis, Calif.	11	Coast (3)	626	Beldi Giant (3)	2777	Coast (2)	2821	Hodge (2)	982	California Mariout (2)	1455
Rosslyn, Va.	19	Orel (4)	351	Wisconsin Winter (3)	2167	Pidor	901	Wisconsin Winter	2159	Scottish Pearl	277
Blacksburg, Va.	27	Union Winter (4)	583	Virginia Selection	3153	Virginia Selection (4)	3164	Virginia Selection (4)	3163	Featherston (3)	911
Athens, Ga.	14	Turkestan (4)	711	Tennessee Winter (4)	257	Wisconsin Winter (4)	519	Argentine (4)	223	Mammoth Winter (4).	220
Knoxville, Tenn.	4	Union Winter (2)	583	Tennessee Winter (1)	257	Beardless 20 (1)	2745	Beardless 6 (2)	2746		
Jackson, Tenn.	2	Union Winter (4)	583	Beardless 20 (4)	2745						
State College, N. Mex.	6	Tennessee Winter (2)	257	O. A. C. Selection 7 (2).	2814	Coast (2)	690	O. A. C. Selection 8 (2).	2813	Maryland Winter (2)	518

TABLE 97.—*Five-year average performance of varieties of barley, 1917 to 1921, inclusive, shown by stations*

Varieties and stations	Rank	Number compared
Svanhals (C. I. No. 187):		
Mandan, N. Dak	2	6
Mitchell, Nebr	3	5
Sheridan, Wyo	3	8
Lincoln, Nebr	5	16
Moccasin, Mont	5	13
Huntley, Mont	5	5
Newlands, Nev	5	7
French Chevalier (C. I. No. 2900):		
St. Paul, Minn	5	10
Waseca, Minn	4	8
Duluth, Minn	2	6
Chevalier II (C. I. No. 200):		
Newell, S. Dak. (irrigated)	2	7
Huntley, Mont	3	5
Horn (C. I. No. 926):		
Havre, Mont	1	12
Archer, Wyo	2	13
Union, Oreg	2	10
Charlottetown 80 (C. I. No. 2732):		
State College, Pa	1	6
Hanna (C. I. No. 203):		
Dickinson, N. Dak	3	18
Williston, N. Dak	1	12
Gold (C. I. No. 1145):		
East Lansing, Mich	3	18
Fort Collins, Colo	3	24
Hannchen (C. I. No. 531):		
Moccasin, Mont	1	13
Burns, Oreg. (irrigated)	1	7
Burns, Oreg. (dry land)	2	7
Mandan, N. Dak	3	6
Williston, N. Dak	3	12
Eureka, S. Dak	3	5
Newell, S. Dak. (irrigated)	3	7
Newlands, Nev	3	7
Dickinson, N. Dak	4	18
Cottonwood, S. Dak	4	5
Newell, S. Dak. (dry land)	4	8
Huntley, Mont	4	5
Sheridan, Wyo	5	8
White Smyrna (C. I. No. 195):		
Mandan, N. Dak	1	6
Garden City, Kans	1	6
Sheridan, Wyo	1	8
Aberdeen, Idaho (dry land)	1	7
Eureka, S. Dak	2	5
Cottonwood, S. Dak	2	5
Huntley, Mont	2	5
Akron, Colo	2	10
Lincoln, Nebr	4	16
Tribune, Kans	4	8
Hays, Kans	5	15
Havre, Mont	5	12
Chico, Calif	5	18
White Smyrna (C. I. No. 658):		
Newell, S. Dak. (dry land)	1	8
Burns, Oreg. (dry land)	1	7
Dickinson, N. Dak	2	18
Burns, Oreg. (irrigated)	2	7
Archer, Wyo	4	13
North Platte, Nebr	5	6
White Smyrna (C. I. No. 910):		
Moccasin, Mont	2	15
Sandpoint, Idaho	2	6
Lind, Wash	4	5
Svansota (C. I. No. 1907):		
Duluth, Minn	1	6
Grand Rapids, Minn	4	8
Morris, Minn	5	14
Manchuria (C. I. No. 241):		
Ames, Iowa	4	10
Manchuria (C. I. No. 244):		
Edgeley, N. Dak	2	4
Manhattan, Kans	2	28
Fargo, N. Dak	4	8
Manchuria (C. I. No. 244)—Con.		
Eureka, S. Dak	4	5
Garden City, Kans	4	6
Cottonwood, S. Dak	5	5
Brookings, S. Dak	5	14
Manchuria (C. I. No. 2330):		
La Fayette, Ind	2	9
Waseca, Minn	1	8
St. Paul, Minn	2	10
Grand Rapids, Minn	2	8
Crookston, Minn	2	19
Morris, Minn	2	14
Duluth, Minn	3	6
O. A. C. 21 (C. I. No. 1470):		
Storrs, Conn	3	3
Ames, Iowa	3	10
Lincoln, Nebr	3	16
Crookston, Minn	5	19
Madison, Wis	1	10
Wisconsin Pedigree (C. I. No. 835):		
Storrs, Conn	1	3
Urbana, Ill	1	5
De Kalb, Ill	2	6
State College, Pa	4	6
Wooster, Ohio	4	5
La Fayette, Ind	5	9
Fargo, N. Dak	5	8
Oderbrucker (C. I. No. 1272):		
Ithaca, N. Y	1	15
Ames, Iowa	1	10
Madison, Wis	3	10
Oderbrucker (C. I. No. 836):		
De Kalb, Ill	1	6
Edgeley, N. Dak	1	4
Ithaca, N. Y	3	15
Urbana, Ill	2	5
Minsturdi (C. I. No. 1556):		
St. Paul, Minn	1	10
Grand Rapids, Minn	1	8
Crookston, Minn	1	19
Waseca, Minn	3	8
Odessa (C. I. No. 182):		
Brookings, S. Dak	1	14
Eureka, S. Dak	1	5
Highmore, S. Dak	1	15
Cottonwood, S. Dak	1	5
Colby, Kans	1	14
Garden City, Kans	2	6
Tribune, Kans	3	8
Newell, S. Dak. (dry land)	5	8
Manhattan, Kans	5	28
Trebi (C. I. No. 936):		
Newell, S. Dak. (irrigated)	1	7
North Platte, Nebr	1	6
Mitchell, Nebr	1	5
Huntley, Mont	1	5
Aberdeen, Idaho (irrigated)	1	9
Union, Oreg	1	10
Columbia, Mo	2	35
Sheridan, Wyo	2	8
Newlands, Nev	2	7
Archer, Wyo	3	13
Ithaca, N. Y	4	15
Sandpoint, Idaho	4	6
Moscow, Idaho	4	23
Aberdeen, Idaho (dry land)	4	7
Burns, Oreg. (irrigated)	4	7
Coast (C. I. No. 626):		
Newlands, Nev	1	7
Davis, Calif	1	11
Chico, Calif	4	18
Highmore, S. Dak	5	15
Sandrel (C. I. No. 937):		
Columbia, Mo	1	35
Archer, Wyo	1	13
Aberdeen, Idaho (irrigated)	3	9

TABLE 97.—*Five-year average performance of varieties of barley, 1917 to 1921, inclusive, shown by stations*—Continued

Varieties and stations	Rank	Number compared	Varieties and stations	Rank	Number compared
Coast (C. I. No. 690):			Winter Club (C. I. No. 592):		
Tribune, Kans.	1	4	Moscow, Idaho	1	23
Newell, S. Dak. (dry land)	2	8	Pullman, Wash.	1	13
Hays, Kans.	2	15	Burns, Oreg. (irrigated)	3	7
North Platte, Nebr.	3	6	Nephi, Utah	4	6
Colby, Kans.	3	14	Burns, Oreg. (dry land)	5	7
Garden City, Kans.	3	6	Tennessee Winter (C. I. No. 257):		
Akron, Colo.	3	10	State College, N. Mex.	1	6
Burns, Oreg. (dry land)	3	7	Athens, Ga.	2	14
State College, N. Mex.	3	6	Knoxville, Tenn.	2	4
Mandan, N. Dak.	4	6	Nephi, Utah	3	6
Newell, S. Dak. (irrigated)	4	7	Union Winter (C. I. No. 583):		
Manhattan, Kans.	4	28	Knoxville, Tenn.	1	4
Sheridan, Wyo.	4	8	Jackson, Tenn.	1	2
Archer, Wyo.	5	13	Wisconsin Winter (C. I. No. 519):		
Nephi, Utah	5	6	Pullman, Wash.	3	13
Burns, Oreg. (irrigated)	5	7	Rosslyn, Va.	2	19
Beldi Giant (C. I. No. 2777):			Manhattan, Kans.	3	28
Aberdeen, Idaho (irrigated)	2	9	Athens, Ga.	3	14
Aberdeen, Idaho (dry land)	2	7	Moscow, Idaho	5	23
Davis, Calif.	2	11	Meloy (C. I. No. 1176):		
Pullman, Wash.	4	13	Lind, Wash.	2	5
Beldi Dwarf (C. I. No. 190):			Moccasin, Mont.	3	13
Chico, Calif.	3	18	Colby, Kans.	4	14
Hays, Kans.	4	15	Moro, Oreg.	5	15
Club Mariout (C. I. No. 261):			Lion (C. I. No. 923):		
Lincoln, Nebr.	1	16	La Fayette, Ind.	1	9
Hays, Kans.	1	15	State College, Pa.	2	6
Moro, Oreg.	1	15	De Kalb, Ill.	3	6
Chico, Calif.	1	18	Fargo, N. Dak.	3	8
Aberdeen, Idaho (dry land)	3	7	Columbia, Mo.	5	35
Mandan, N. Dak.	5	6	Aberdeen, Idaho (dry land)	5	7
Garden City, Kans.	5	6	Gatami (C. I. No. 575):		
Tribune, Kans.	5	8	Brookings, S. Dak.	3	14
Flynn (C. I. No. 1311):			Cottonwood, S. Dak.	3	5
Moro, Oreg.	4	15	Newell, S. Dak. (dry land)	3	8
			Hays, Kans.	3	15
			Eureka, S. Dak.	5	5

It will be noted that the names of some varieties occur a large number of times. Such varieties must possess high yielding capacity. Their range of adaptation perhaps is better shown in Table 97. In this table many of the prominent varieties are included in such a manner as to show the stations at which they have given high yields for this period. The rank at each place also is shown. The wide range of adaptation of White Smyrna already has been pointed out. The Coast varieties (C. I. Nos. 690 and 626) are shown to be good at Tribune, Kans., at Davis, Calif., at State College, N. Mex., and at Mandan, N. Dak. The range of Winter Club (C. I. No. 592) is limited to the Great Basin. The Oderbrucker and Manchuria varieties have done well at stations from Ithaca, N. Y., to Edgeley, N. Dak., and from Ames, Iowa, to Crookston, Minn. The good yields of Gatami (C. I. No. 575) have been limited to that section of the Great Plains from Hays, Kans., north to Eureka, S. Dak. It is interesting to note that the high yields from Hannchen (C. I. No. 531) and Svanhals (C. I. No. 187) were obtained at stations from Eureka, S. Dak., and Mandan, N. Dak., west to the Pacific coast. To judge from the origin of these varieties, it would be expected that their best adaptation would be farther east.

DISTRIBUTION OF VARIETIES BY EXPERIMENT STATIONS

It is obvious from the volume of the results reported that there has been a large expenditure of funds in the introduction, breeding, and testing of barley varieties in the United States and Canada. The question naturally arises as to how profitable this investment has been and to what extent the varieties so produced and so recommended are in cultivation to-day. A review of the situation leads to the conclusion that the investment has already been many times repaid and will continue to be repaid as long as barley is cultivated.

Four basic types—(1) Coast, (2) a barley closely allied to the Manchuria, (3) Tennessee Winter, and (4) Stavropol—found their way into cultivation without the assistance of national or State investigations. Coast was so well adapted to the Western States that for most of the period of experimentation it has been the variety recommended by experiment stations. It is only recently that superior sorts have been found for local conditions in the West. The introduction of Manchuria and Oderbrucker, which were tested and distributed by the stations, resulted in displacing the related form mentioned above as basic type No. 2. These varieties now constitute the greater part of the acreage of the upper Mississippi Valley and adjoining sections of Canada.

Stavropol probably was imported by the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture and was distributed by the Kansas Agricultural Experiment Station. It is more than plausible to assume, however, that this same barley was brought repeatedly from southern Russia by Russian immigrants and that there was a large acreage of this type of barley in northwestern Kansas before any was sent out by the State station.

In comparing the expense with the returns in barley studies it must be realized that the great bulk of the expenditure has been in the last few years. There has not been time to secure returns on those varieties recently produced. Club Mariout was brought to America in 1904. After years of testing it is just now becoming of commercial importance. There are many varieties still with a very limited acreage which have great potential importance. Trebi, now extensively grown in southern Idaho and the irrigated section of western Nebraska, is meeting with popular favor and is giving yields far greater than those of the varieties displaced. California Mariout is advantageously cultivated in parts of the San Joaquin Valley which are too dry for high yields of Coast barleys. Many superior selections of Oderbrucker and Manchuria have been distributed in Wisconsin, Minnesota, and North Dakota. Alpha, Horn, O. A. C. 21, Minsturdi, Svansota, Featherston, and many more such new productions have yielded extremely well in recent tests and are now appearing in field agriculture. The potential value of such varieties in the next 10 years is very great. Back of these, on the field plats and breeding nurseries, are many others with which much of the work of breeding and testing has already been accomplished.

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